MARCH 1943

MOTOR AGE

FOR AUTOMOTIVE SERVICEMEN

A CHILTON PUBLICATION

The man without a . . . car

[HE TOOK GOOD CARE OF HIS TIRES BUT LET HIS ENGINE WEAR OUT]

Pity this poor fellow. He forgot that you have to save everything about a car—that a car with a wornout engine is just as useless as a car without tires.

DON'T you forget that there is also a steel shortage; that our cars, trucks and buses contain more than 30,000,000 tons of steel—more than a third of our total annual production.

The *ton of steel* in your car is a vital trust—it must not be neglected—its life must be stretched to the utmost.

One of the smallest but most important things to watch is the piston rings. Good rings protect your cylinder walls, pistons and other vital parts—hold wear to a minimum—and help you get maximum gasoline and oil mileage.

Hastings Steel-Vent piston rings, proved by millions of miles of service in less critical times, are more than ever the rings for today. Consult your motor service man.

HASTINGS MANUFACTURING COMPANY, HASTINGS, MICH.
Hastings Mfg. of Canada, Ltd., Toronto

Save your **TON** *of steel!*

HASTINGS STEEL-VENT PISTON RINGS

Tough *on oil-pumping* • **Gentle** *on cylinder walls*

Reproduced from The Saturday Evening Post, March 6.

Someone, somehow, had to make the car-owning public stop, look and listen—to the fact that it's just as necessary to save the engine as to save the tires. This "ad" did it. If you want a large reproduction to display in your shop or service department, just mail a post card today.

A Peace-Time Development

BECOMES

A War-Time Necessity

● The advanced engineering principles of "Individual Tuning" that so firmly established Walker Silencers as the peace-time leader in replacement mufflers are *now more important than ever.*

The vital transportation needs of war demand the utmost efficiency from every individual vehicle. The irreplaceable character of those vehicles demands that there be no compromise with quality in the replacement parts needed for their continued operation.

INDIVIDUAL TUNING—pioneered...developed and perfected by Walker means the utmost in exhaust system performance for each make and model of car.

INDIVIDUAL TUNING means that Walker Silencers are engineered not only to control every phase of the exhaust sound . . . but also to all of the requirements of materials . . . of construction . . . of dimension . . . of back pressure . . . of quietness . . . and of actual road performance.

It is fortunate, indeed, that the peace-time vision of Walker engineers . . . prompted by the desire to serve motorists better under all circumstances . . . had already developed a line of Walker Silencers so superior in their performance that they can now play an essential part in our war effort—through you as an automotive service man.

WALKER MANUFACTURING COMPANY OF WISCONSIN, RACINE, WIS.

WALKER EXHAUST SILENCERS WITH "INDIVIDUAL TUNING"

BY THE MAKERS OF WALKER LIFTS AND JACKS

MOTOR AGE

With Which is Combined AUTOMOBILE TRADE JOURNAL

FOR AUTOMOTIVE SERVICEMEN

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MARCH • 1943

SHOP TALK

by

Bill Toboldt

Rural Boom

With an acute shortage in farm equipment of all sorts, repair shops in rural sections are working overtime trying to keep tractors, binders and other equipment in operating condition. As the farming season progresses, even more repairs will be needed and shop operators should start now to prepare for this additional work. In some shops, which have not lost so many mechanics, old passenger-car and truck chassis are being reworked and made into serviceable tractors—and at a profit.

Unclaimed

Some months ago, J. A. Bascle, President of the B. B. Engineering Service Corp., New Orleans, wrote to me asking for some information on the Rolls-Royce and the Junkers aircraft engines. I dug this up and sent it on its way and then the letter came back marked by the post office "Unclaimed." The dope is here waiting for you, Bascle, if you still want it.

Busy Future

While the maintenance business is even better than good today, many parts and equipment manufacturers believe that, as we get closer to peace, it will be still better and continue at a high level for several years after new-car production is resumed. The reason for this is, that, in spite of gasoline rationing, cars are continuing to run and the longer they run the more maintenance they require.

Gas Hopes

Advance reports indicate that by the end of March so-called pleasure driving will again be permitted in the East. Whether this is a victory for the thousands of A book holders or an admission of the inability of the OPA to police pleasure driving is anyone's guess. However, any pleasure that the car drivers may get from the ability to drive their cars where they please will be considerably mitigated by the reported reduction in the value of the A coupon from three to two gallons. However, this in turn is somewhat offset by the hint that any A book holder who does not have sufficient gasoline to drive to work may apply for additional fuel.

In the West, there is a strong feeling that rationing will be considerably eased by summer. One of the reasons advanced for this feeling is that the White House is considerably worried over the political repercussions of rationing, which is interesting, if true, and the other is that the synthetic-rubber situation is very much better than reported in the press.

SMALL SHOPS MAY

RAISE WAGES AND PRICES

Under new OPA rulings, shops employing eight persons or less can now compete against war plants for mechanics

AT last, some measure of relief has been given automobile shops whose force of mechanics has been depleted by war industries. Help has been extended in the form of an amendment to Maximum Price Regulation 165, in which the OPA authorizes automobile and farm-equipment shops employing eight persons or less to pass on to the customer any increase in labor cost incurred since March last year.

Large dealer and independent shops employing more than eight persons are still covered by the executive order and cannot adjust wages without War Labor Board consent.

This amendment was designed solely to allow the designated shops to pay mechanics high enough wages to keep them from drifting to war plants and from succumbing to the blandishments of labor pirates now scouring every section of the country where mechanics have not been frozen to their jobs.

The steps that must be taken before a shop can put new wage rates and customer charges into effect are described on Page 34. It is enough to note here that shops employing eight persons or less constitute the great majority of shops now in operation. Exact figures are not immediately available, but it is probable that dealer shops covered by the amendment will run to 80 or 90 per cent of the total and that the percentage of independent shops will be even higher. The term employees, of course, does not mean mechanics alone, but total employees.

Although the announcement of the amendment could not be specific on the point, spokesmen for the OPA have indicated that the extent to which increases in customer charges will be permitted will depend upon the local wage situation. The OPA does not intend to approve any wage increase an exempted shop may choose to make, but only such increase as will give the shop an even chance in the competition for men with war industries and other plants in the area.

For example, if a repair shop has been paying 80 cents an hour for mechanics and finds its men leaving for a war plant or other essential industry where the rate is $1.25 an hour, the exempt repair shop would be justified in raising its hourly rate to $1.25. Then, since it had probably been charging the customer $1.60 an hour for labor when it was paying mechanics 80 cents an hour, it could pass along the higher wage rate by adding the increase to its customer charge, thus making the adjusted customer rate $2.50 an hour.

On the other hand, if a shop elected to raise mechanics' wages from $1 to $1.50 hour, when the rate for comparable skill in the area was $1.25, the OPA could be counted upon to refuse the shop permission to pass along the increase to the customer.

The purpose of the amendment is not to swell profits, which would be contrary to the national policy of curbing inflation, but to enable the smaller shops to obtain the skilled help necessary to continue operation. It may not attain this goal in all areas, since competition for workers is keener in some cities than in others, but it is the first concrete encouragement given automobile repair shops in their struggle to retain a sufficient working force.

Other steps taken by government agencies ostensibly to relieve the manpower shortage in repair shops are falling short of the mark.

In December, the Selective Service System listed automobile repairing as one of 33 critical occupations. Later, mechanics were placed on the same footing as airplane and shipyard workers and other persons employed directly in the production of war goods. Under this directive, the U. S. Employment Offices were directed to fill orders for all occupations with equal zeal. However, the order did nothing of itself to make more men available and in most cities preference is still being given war plants. Further, some local offices are still taking automobile mechanics out of

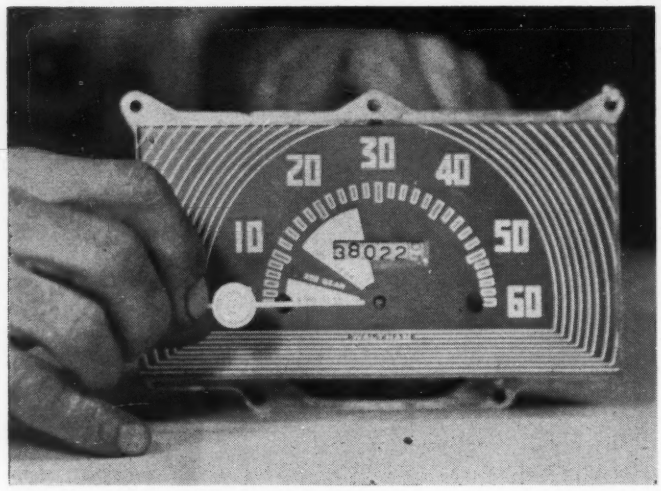
repair shops and placing them in war plants. This is not a misunderstanding of orders on the part of local USES offices. Manpower officials at Washinkton declare that, essential or not, automobile mechanics are subject to transfer to other jobs if the need arises. Even where employment stabilization bureaus exist, as at Detroit and Baltimore, the bureaus "urge" such transfers. It is necessary, these officials explain, for the commission to weigh the relative importance of the jobs involved. So long as this practice persists, the repair shop cannot hope for any relief from this quarter.

So far as the draft is concerned, the repair shop is in little better position. Selective Service officials are interested first of all in building up the armed forces and do not seem disposed to lean very far to keep civilian motor transportation operating.

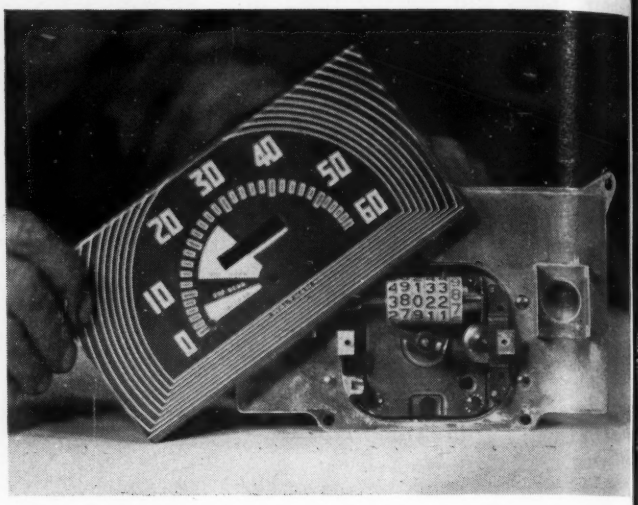
Many shops gained the impression from the announcement that mechanics were engaged in essential occupations, and therefore deferable, that a blanket deferment had been granted them. This assumption is entirely groundless. Deferments are granted only in individual cases and for only six months. The employee has no say in the matter; the employer must make application to the local draft board on behalf of each individual mechanic. Generally, the draft boards are hard to convince. Their usual objection is that the man for whom deferment is sought is a grease-rack man or a helper or some one else for whom a replacement can be trained in less than six months.

Further, the board does not necessarily consider the needs of an individual shop. It looks upon the maintenance of essential vehicles in an area as a community problem, and, so long as it believes the vehicles in the area can be serviced by the total number of mechanics left in all the shops in the community, it will not defer a man no matter how vital he may be to one shop.

The attitude of both the War Manpower Commission and the Selective Service System affords little hope for help in getting mechanics or even keeping the ones now on the job. That makes the OPA action in lifting the price ceiling for shops employing eight persons or less all the more important. At least these shops can bid on an equal footing with other industries for such men—or women —as they can find.

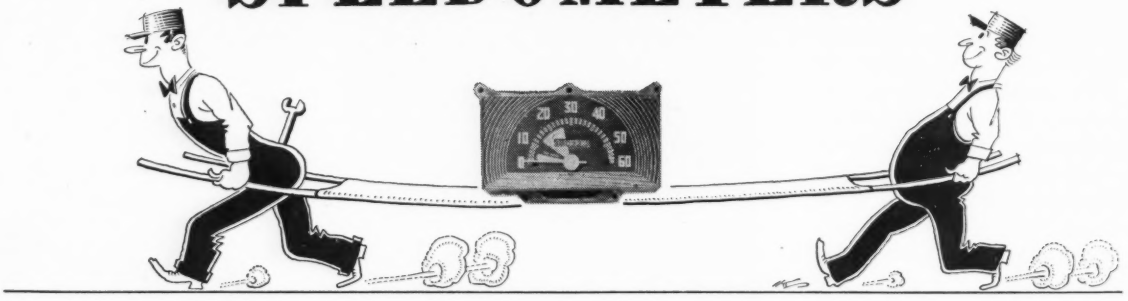


1. Remove the speed-indicating needle from the shaft by turning needle past zero and pulling outward. Special puller not necessary.



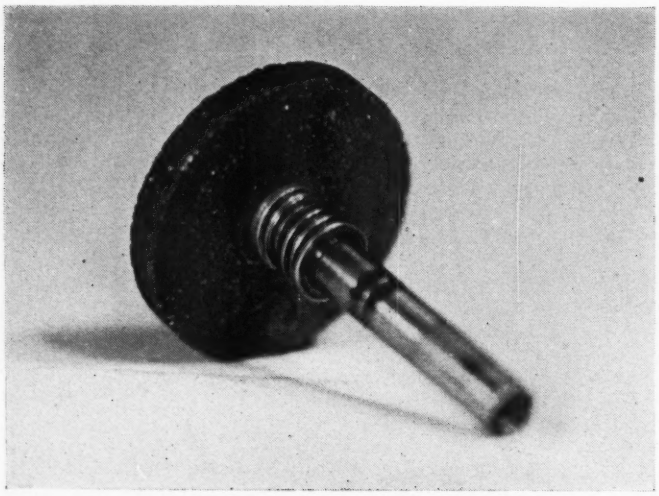
2. Take out the three screws holding the face of speedometer to the base plate and remove the face.

SERVICING SPEEDOMETERS

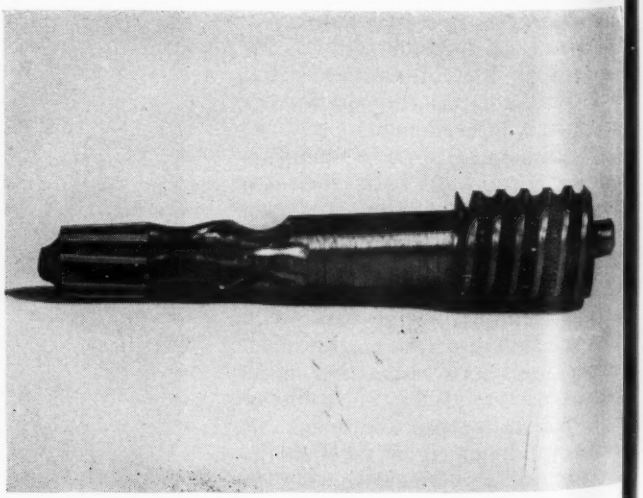


Some valuable tips in picture form to simplify and speed up your work on the Waltham unit as used on the 1940 Ford

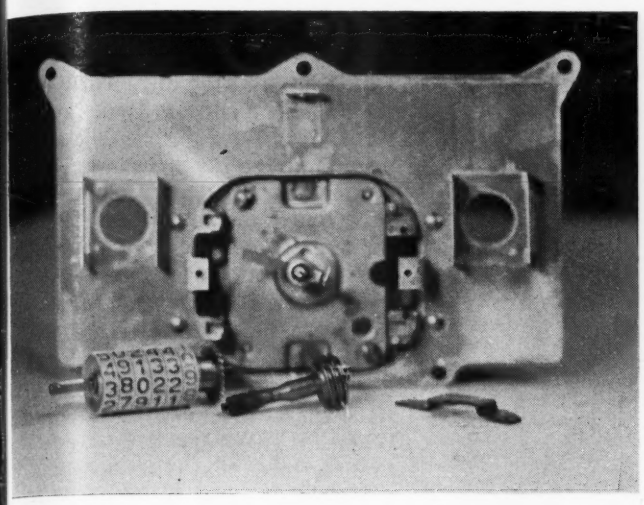
By BOB TURNER



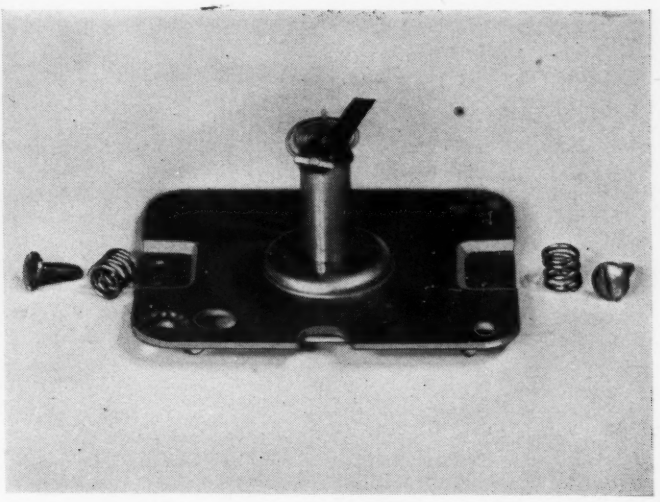
7. Damaged worm gear on main drive shaft.



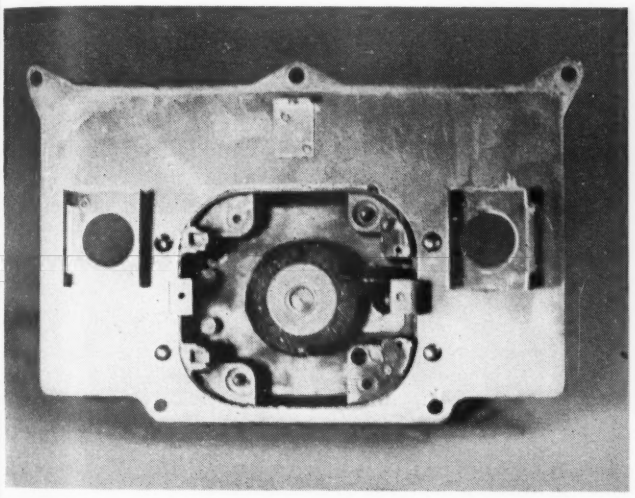
8. Damaged gear on second speed shaft.



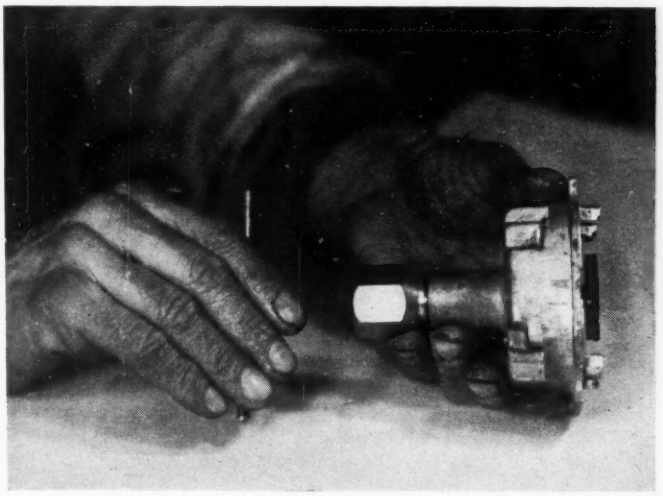
3. Pry off the numeral roll and drive-gear retainer and remove the numeral roll and drive gear.



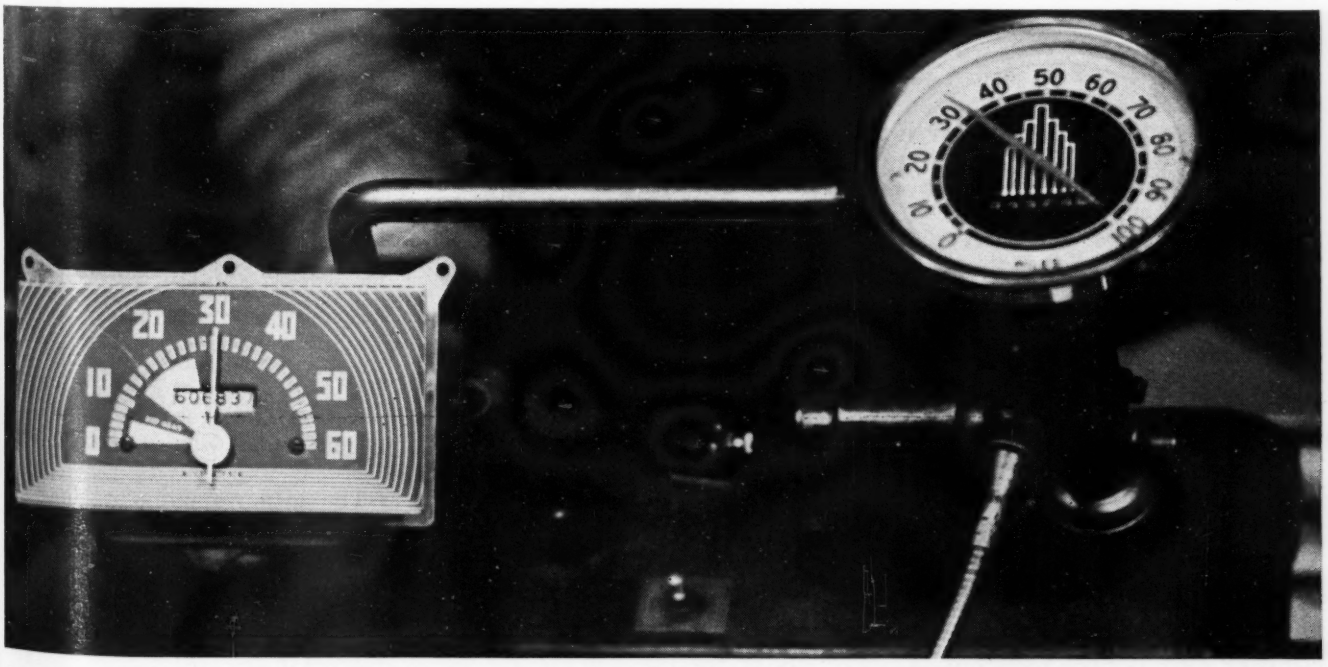
4. Remove the two screws and springs holding the speed cup plate and take out the plate assembly.



5. Take the speedometer mounting plate off the main body casting.



6. Using a special tool, push the magnet and main drive-gear-shaft assembly out of the housing.



9. After new parts are installed and the speedometer reassembled, the instrument should be calibrated against a master speedometer head.

10 LUBE JOBS PER 1,000 GALLONS

That is the average being reached under wartime conditions by shops that go after lubrication business

IN spite of the pleasure-driving ban, in spite of labor and material shortages, and the rubber famine, lubrication remains an outstanding opportunity for the service shop to keep busy and make money. This is the interesting fact uncovered recently by a large oil company when it made a study of its stations under wartime conditions.

One of the most interesting disclosures made by the study was the frequency with which lubrication jobs can be sold today. A well-managed station, the study showed, sells an average of 10 lubrication jobs for every 1000 gal. of gasoline pumped.

This is not the average for all stations, but only for those that do a first-class job of merchandising lubrication. Some stations, doing an exceptional job of pushing lubrication, are running their average to 12 to 15 jobs per 1000 gal. of gasoline. Averages between 5 and 10 jobs per 1000 gal. are considered fair, but stations doing less are considered by the company to be unsatisfactory.

On engine lubrication, a station that sells 1 gal. of oil for every 60 gal. of gasoline is counted a good merchandiser. A fair average is somewhere between 60 and 80. When it rises above 80 to 1, the chances are that the operator is overlooking some bets.

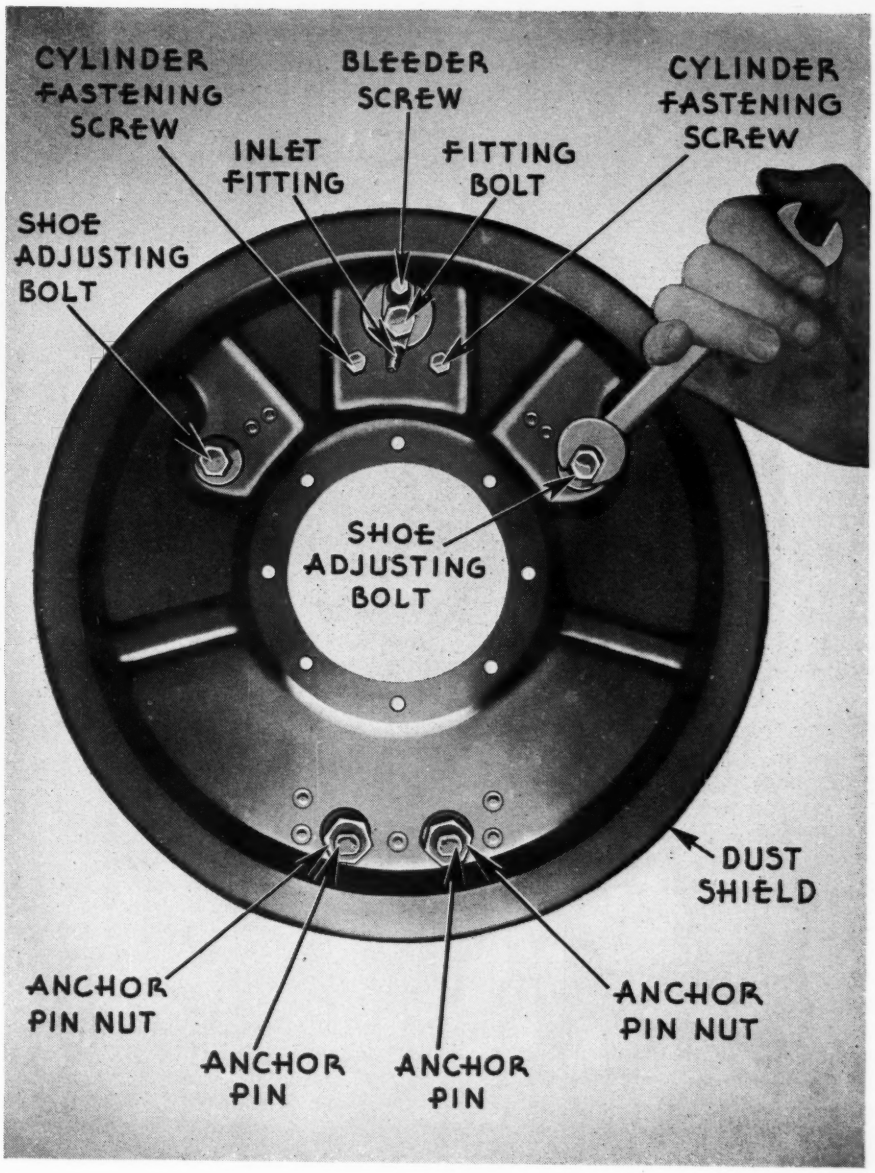
Another source of income that continues good despite obstacles to normal operation is the sale of accessories and supplies. Even with the manufacture of many items discontinued for the duration, many stations average $10 in accessory sales for every 1000 gal. of gasoline sold. Safety items, such as light bulbs and wiper blades, are still being made.

Generally speaking, there has been no change in merchandising effort because of war conditions. The only difference is that effort among the more successful stations has been intensified.

As always, the secret of getting business is to ask for it. Today's conditions make it more important than ever to ask the right owners, for many of them, through no wish of their own, are driving their cars less than they did a year ago. Realizing this, the more successful stations are concentrating upon owners whose driving is essential to the war effort. They are paying closer attention to their owner files, keeping them up-to-date, and following up with direct mail, phone calls, and even personal calls.

Naturally, the holders of B and C cards are the better prospects for service of all kinds, and the money-making shops are keeping close tabs on owners' standing with their ration boards. They never know when an A book holder will get a B book, or vice versa, and the only way they can be sure of keeping abreast of things is to get acquainted with owners and stay friendly with them.

The money-making stations are even more alert than they used to be to related services, such as wheel packs. They never miss a chance to lift the hood. And they don't stop with making a show of taking an interest in the customer's car. They actually do.



HOW TO ADJUST

HYDRAULIC BRAKES

Lesson No. 3 in the timely series of articles designed to help speed the training of skilled brake men

BRAKE adjustment on hydraulic brakes is not a particularly difficult operation, and in general a satisfactory job can be done by apprentice mechanics after the work has been explained and demonstrated by an experienced brake man.

One of the most important things to know about brake adjusting is when is it necessary. Obviously an adjustment is necessary when the brakes do not stop the car in a satisfactory manner, and a satisfactory manner may be described as the ability to stop the car in 20 ft. when traveling at 20 m.p.h. However, brake adjustment is also considered necessary when the pedal goes almost to the floor boards before the brakes are applied.

There are two procedures which may be followed when adjusting hydraulic brakes. One is known as a major adjustment as is used after the brake shoes have been relined or when a "minor" adjustment has proved unsatisfactory. In most cases, a minor adjustment is all that is necessary, as such an adjustment serves to compensate for normal wear of the brake lining.

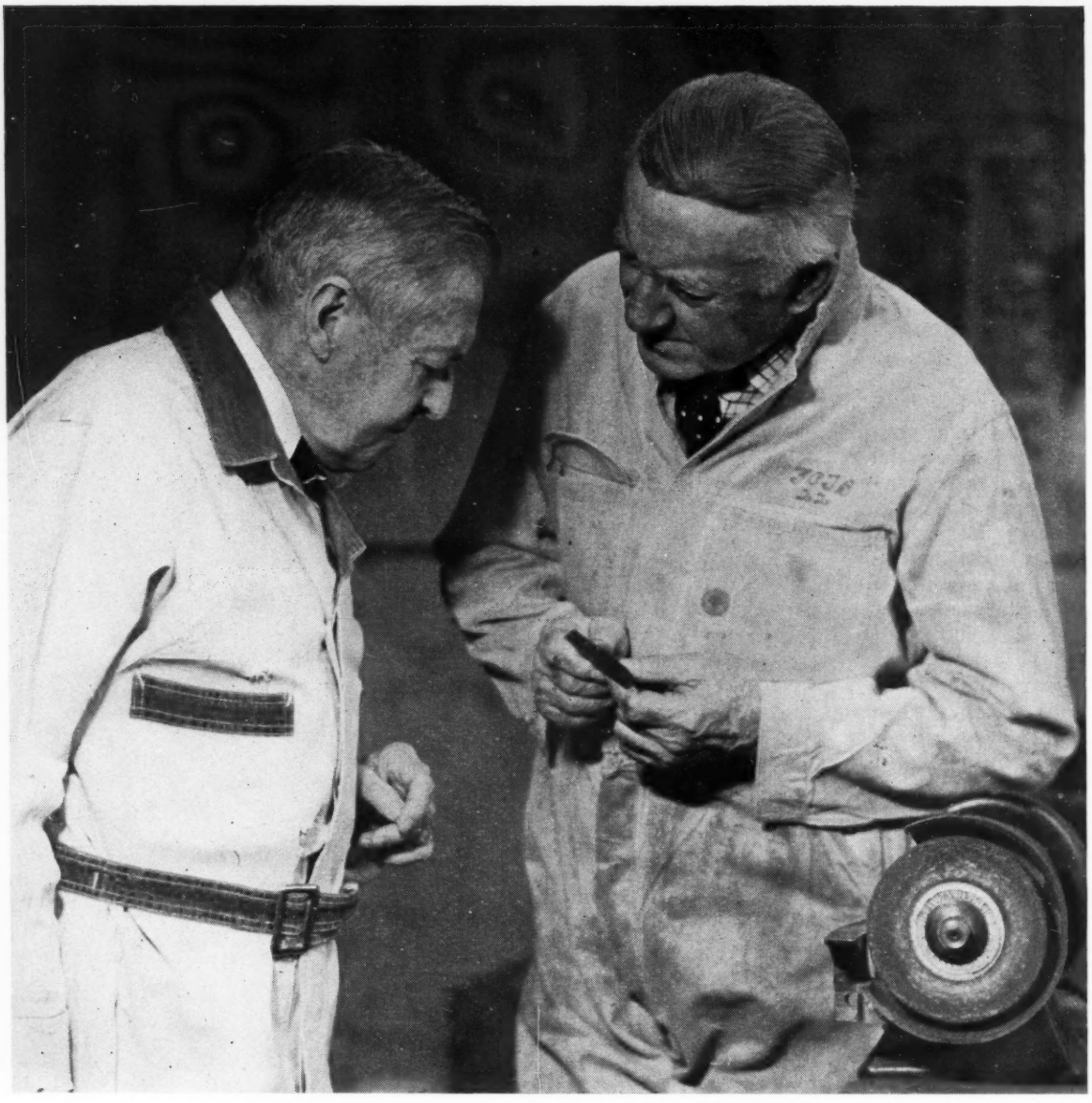
The first step in a minor adjustment of the Wagner or Lockheed type of hydraulic brakes, which are found on such cars as Ford, Chrysler, DeSoto, Plymouth, Dodge, Studebaker, etc., is to raise the car on jacks or a lift so that the wheels are free to rotate.

Then, with the parking brake in the released position, rotate the wheel and at the same time turn the cam adjustment. This adjustment is shown in the illustration and the wrench should be placed on the adjustment with the handle pointing straight upward and then turned toward the rim of the wheel until the brake shoe touches the brake drum. This point is indicated by the sound of the brake drum rubbing against the brake shoes and also by the increased resistance to turning the wheel. As soon as the brake shoe touches the drum, turn the adjustment in the opposite direction until the wheel of the car rotates freely. The adjustment should be backed off only enough to free the wheel—no further.

Make this adjustment on both shoes of all wheels.

Some of these adjustments are provided with lock nuts. In such instances, it is, of course, necessary to loosen the lock nut before making the adjustment. After making the adjustment the lock nut must

(*Continued on Page* 70)



"It's a piece of high-speed steel," said Pop. "But after we finish grind' it, it'll be a lathe cutter bit."

WHEN Horace walked into the office where Pop O'Neill sat frowning at a couple of bedraggled sheets of paper, he was as glum as a man that had just come from a session with his ration board and had lost the argument.

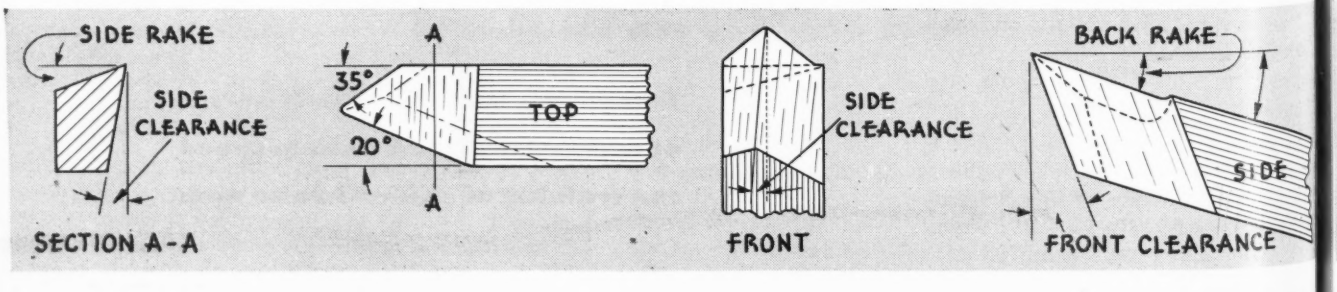
"Say, Pop—" he began.

"Just a minute till I finish this letter."

As soon as Pop had laid down the papers, Horace said: "You call that a letter? It looks like somethin' you been testin' your shotgun on."

"It's a letter from Chuck Masters," said Pop, "the kid that used to work here. He joined the Ma-

Rake and clearance as ground on a right-hand turning tool. All rake and clearance angles vary with the type of metal that is being machined.



THE MOTOR AGE
BASIC COURSE for MECHANIC TRAINING

GRINDING LATHE CUTTER BITS

In the 16th of a series of articles designed to speed the training of competent mechanics, Pop O'Neill discusses a simple but vital job

By J. EDWARD FORD

rines a few months ago, and this is the first time I heard from him since he left. I guess he forgot about the censors. They cut out more of the letter than they left in. All I get out of it is that he landed somewhere some time and expects to see action against somebody sometime if some kind of weather lets up."

"Waste of time writin' it," said Horace.

"I'm glad to hear from him," said Pop. "He's a good kid. I hope he comes through this mess all right. Now, what's on *your* mind, Horace?"

"It's that blasted lathe. I almost ruined a piston I was turnin' down just now. I know it ain't nothin' I done."

"What seems to be wrong?"

"Do you think I'd be wastin' my time in here if I knowed? It just don't cut right."

"Let's have a look at it."

Pop, leading the way out into the shop, stopped before the lathe and studied the piston on which Horace had been working, running a finger over the section that had already been machined. Then, after backing off the tool, he loosened the tool-post clamp and removed the cutter bit. He held it up so Horace could see it.

"There's your trouble, Horace," he said. "Your cutter bit's dull—that's all."

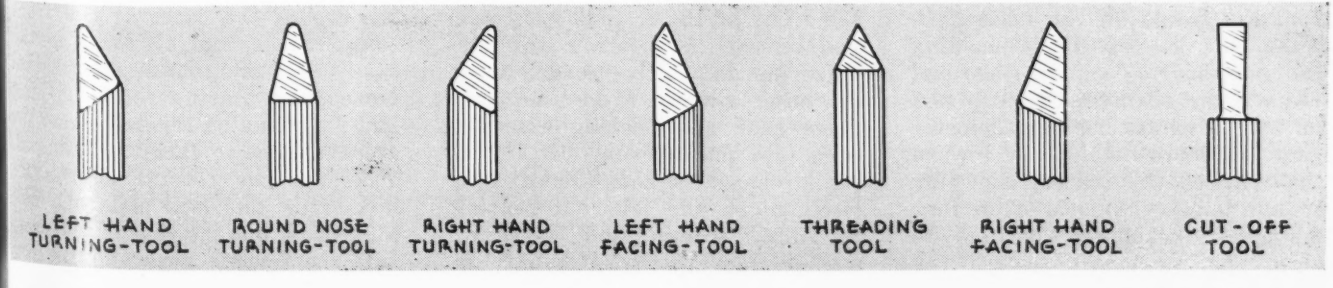
"It's the one you gave me yesterday. You said you'd just sharpened it."

"That's right," said Pop, "and you've been usin' it steady ever since. How long do you think an edge is goin' to last on a tool?"

"It ought to last longer'n that," said Horace stubbornly.

(*Continued on page* 48)

Most commonly used lathe tools, showing the use for which each is designed. There are many other tools for special jobs, such as knurling.

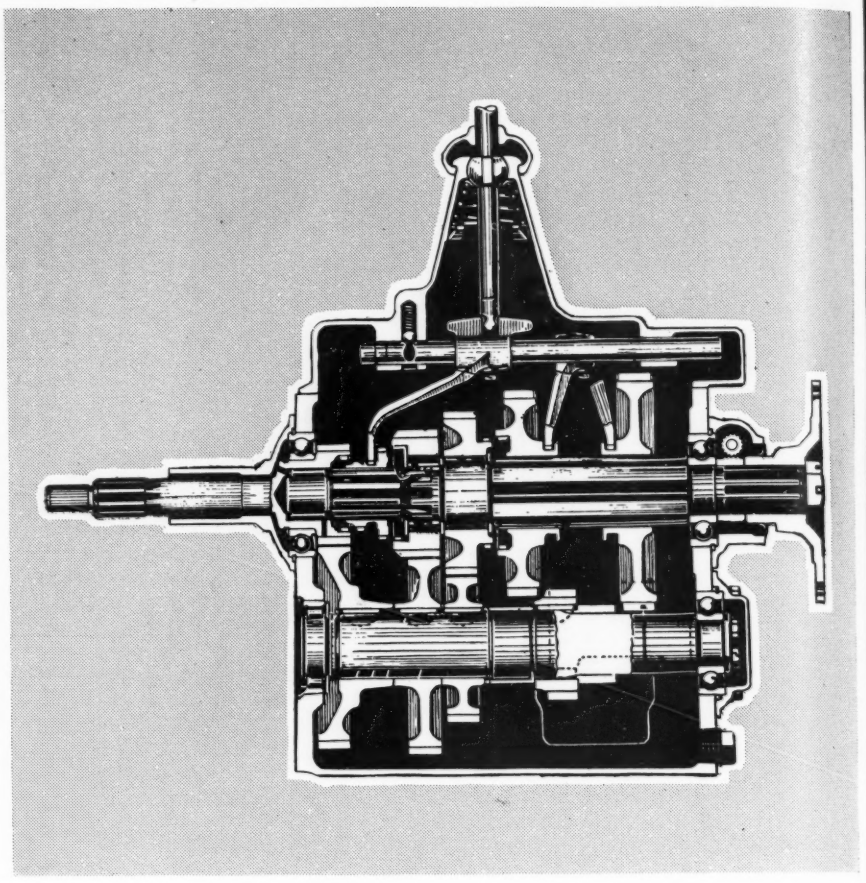


THIS transmission is the selective sliding type, with five speeds forward and one reverse, and is available as either an underdrive or an overdrive. The underdrive type provides direct drive in fifth speed, while the overdrive type provides direct drive in fourth speed with fifth speed as the overdrive.

The unit is standard equipment on GMC model CCKW-350 overdrive, and optional on models CC-350, CC-400, and CC-450, CF-350, CF-450, CF-400, CCS-350, CCS-400, CCS-450, CFT-350, CFT-400, CCT-350, CCT-400, CFW-350, CFW-400, CCW-350, CCW-400, and CCK-350.

To remove the unit from the truck, first take out the floor boards and disconnect the brake pull rods. On some models, these rods are not mounted on the transmission and do not need to be removed. Disconnect the speedometer cable and take out the speedometer drive pinion. Remove the bolts from the flanges of both the front and rear joints. Take off the nuts on the studs holding the center bearing in position. The entire drive line may now be removed as an assembly.

Take out the strut rod between the transmission and frame cross member. Remove the lower clutch housing and the two lower transmission support screws from inside the clutch housing. Place a support under the transmission case and remove the two upper transmission support bolts. Pull transmission assembly straight back until the clutch shaft is clear of the clutch disc and then lower the transmission assembly. Thoroughly clean the outside of the transmission assembly and then remove the cover assembly, drain the lubricant and thoroughly clean the inside. The transmission may now be moved to the bench for disassembly and repair.



Sectional view of the type C202V five-speed underdrive transmission.

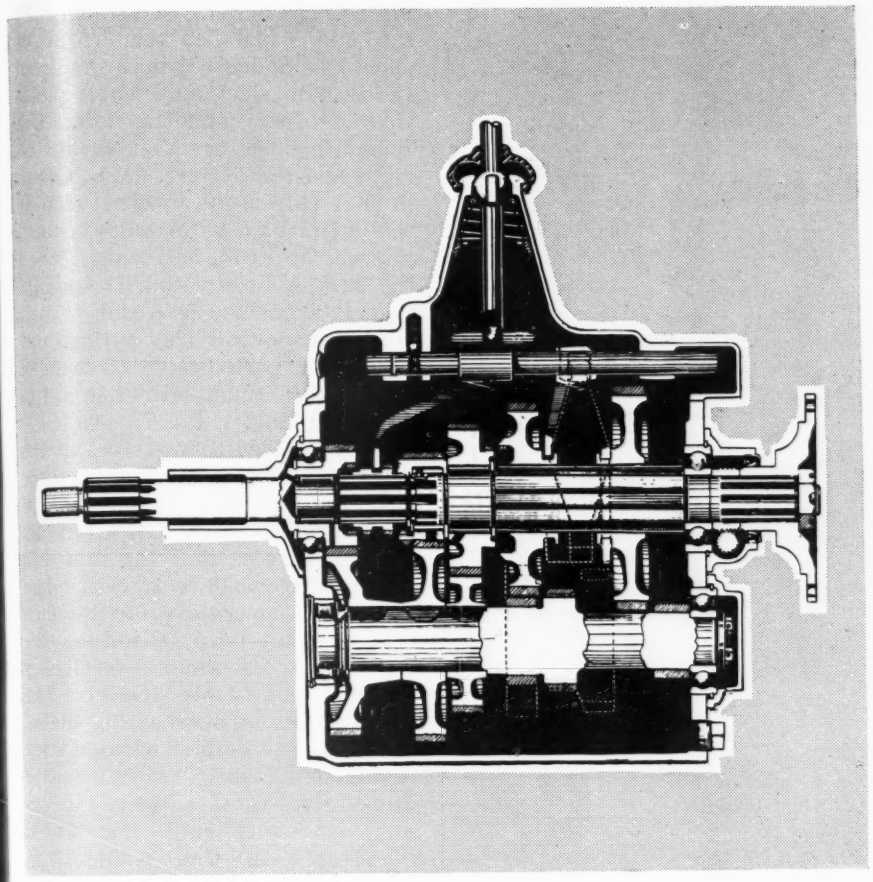
TRUCK T

Here's the information you need to service types

Before proceeding to disassemble the transmission, disconnect the handbrake lever and remove the brake band from the transmission. Lock the mainshaft by moving two gears into mesh and remove the nut from the rear of the mainshaft. Pull the flange off the mainshaft. Take out the cap screws holding the rear bearing cap in place and remove the rear bearing cap and oil seal assembly and speedometer gear. Slide the mainshaft toward the rear of the transmission far enough to allow removal of the rear mainshaft bearing. Continue to move the mainshaft toward the rear far enough for the front end to clear the main drive gear, then lift the entire mainshaft assembly front end upward and remove it from the case.

Take out the cap screws holding the main drive gear bearing cap at the front of the transmission case and remove the bearing cap. Remove the main drive gear bearing retaining ring. Slide the main drive gear and bearing assembly back into the case and lift it out. Next remove the countershaft rear bearing cap and take out bearing retaining screws and retaining washer. Move the countershaft toward the rear of the transmission case and pull the rear bearing off the shaft.

The countershaft assembly may now be removed by sliding the assembly backwards, tilting the front end upward and lifting out through the top of the case. If the front countershaft bearing stays in the case when the countershaft is removed, the bearing retaining ring and plug may be removed from the front of case to facilitate removal. Take out the reverse idler shaft lock screw and lock plate and pull idler shaft out the rear of the case. Lift the reverse gear and bearing



The overdrive transmission, Type C204VO. This also has five speeds.

TRANSMISSION OVERHAUL

C202V and C204VO five-speed under and overdrive used on various GMC models

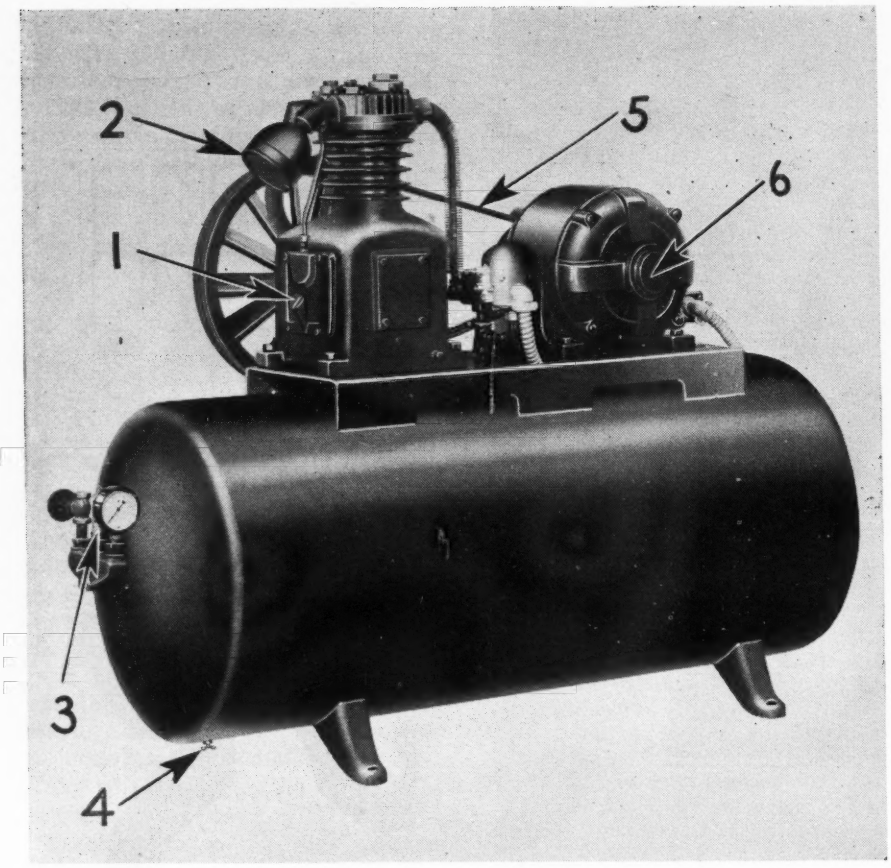
assembly out through top of case.

To disassemble the mainshaft, remove the sliding gears. Spread the snap ring on the front end of the shaft and slide over the splines and off the shaft. Turn the thrust washer to aline with splines on the shaft and remove the washer from the shaft. Lift the fourth or fifth speed gear, as the case may be, and the roller bearings, if used, off the shaft. Remove the third speed gear with front and rear thrust washers and roller bearings. Care must be exercised not to lose any of the rollers (there are 34 rollers used in this gear).

The three forward gears on the countershaft are keyed on the countershaft and may be removed by pressing them off the shaft in an arbor press.

To disassemble the transmission cover assembly, drive out the expansion plugs in the front and side of the cover. Remove the shift-fork set screws and push the shift rods out the front of the cover, holding hand over the poppet holes in forward rod support to prevent loss of the balls and springs. All rods must be in neutral position at the start of the operation. Tip the cover on the side and let the interlock balls drop out of the side of the cover.

All parts should be thoroughly cleaned and inspected. Any parts showing excessive wear or gears that are pitted should be replaced. The third and fourth or fifth speed gear thrust washer should measure .119 to .121 in. Third and fourth or fifth speed mainshaft gear shim should measure .003 to .005 in. The gear backlash should be .005 to .008 in. The countershaft front bearing thrust washer thickness should be .095 in. The shift rail poppet spring free length should be 1 7/16 in. and show a pressure of 45 to 50 lb. at 15/16 in.



1. Check oil level every week. 2. Clean air intake and muffler filter elements every 60 days or less. 3. Test safety valve monthly. 4. Open drain valve, blow off water every week. 5. Check belts when cleaning unit. 6. Clean, lubricate electric motor at each inspection.

HOW TO MAKE YOUR COMPRESSOR LAST

Give this hard-to-replace unit the care outlined here and it will last longer and give you better service

WITH practically the entire supply of new air compressors needed for war production, every effort must be made to get the maximum amount of work from air compressors now in service. The primary requirement for improved operation and conservation is frequent inspection.

Proper installation of the unit is of great importance. You should check each of the following points to be sure you have a correctly installed compressor unit: Install the compressor unit in a clean, dry place. The unit should not be placed near a radiator or boiler. If the unit is installed near a wall, it should be at least 6 in. away from the wall to allow sufficient circulation of air around the unit. The foundation for the unit should be rigid and the compressor bolted to it. For safety, the flywheel side of the unit should be installed toward the wall to avoid accidents. When the unit is installed on its foundation, it should be leveled before it is bolted down. The entire unit should be periodically cleaned of dirt and oil accumulations to aid in proper cooling.

All air-cooled compressors of the automotive type are designed for intermittent operation and should be selected for size by given air requirements so that the unit will not operate over 3 to 4 hr. per day. Continuous operation of the unit with no shut-down periods is the chief cause of trouble developing as the result of overheating. The usual results of overheating of the unit are an excessive accumulation of carbon, leaking valves, burned check valve seats, excessive oil consumption, stuck rings and scored cylinders. All this trouble can probably be avoided by the proper care and periodic servicing of the unit. If the following services are performed at the intervals suggested many of the foregoing troubles will be eliminated.

The oil level in the compressor unit should be checked once each week and maintained at its proper height. The oil used should conform to the compressor manufacturer's specifications. When the oil in the compressor starts to become dirty, it should be drained and the unit refilled with fresh oil. Air intake and muffler filter elements should be cleaned at regular intervals. The interval between cleanings should not be over 60 days and, when the compressor is installed in a dusty location, the length of time between cleaning of the filters should be shortened.

The safety valve should be tested each month for free operation and leaking. The setting of the safety valve must not be changed and, if it is not operating properly, it should be replaced. Open the drain valve on the tank at least once a week and allow the pressure to blow off accumulated moisture in the tank. If the water is allowed to collect in the tank, it cuts down the space for air storage and increases the frequency of operation of the compressor.

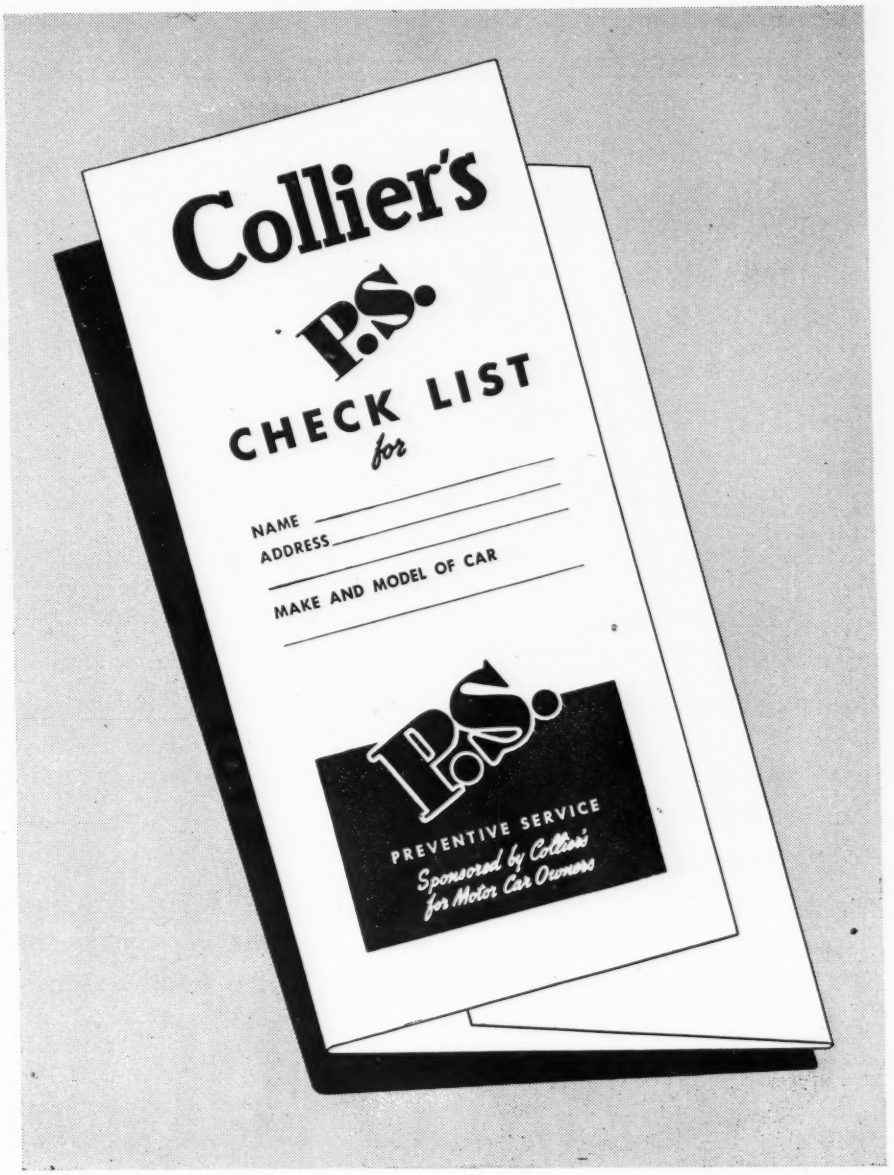
(*Continued on page* 58)

CHECK

ON MAINTENANCE COSTS

Handy folder encourages customer to buy service regularly and helps the shop to spread its work evenly

By ***ROSE LU GOLDMAN***



IN spite of drastic curtailments in driving — mileage control, gasoline rationing, and all—a majority of today's automobile repair shops are so rushed with business that they need more mechanics. They are turning away customers every day because they can't get trained help.

We've talked with the service managers in some of these shops in an attempt to find out what can be done to ease the situation. They all agree on one thing: One-third of their time is *wasted* just in turning business away—telling people that they can't take care of them now, "but if you'll come back Wednesday. . . ."

In January we discussed this same problem with you and suggested you might cut down interruptions by starting an appointment system such as dentists, doctors, and hairdressers have been using for years.

Since we wrote that article, we have learned that *Collier's* magazine, through its regular automotive articles, is helping you educate your customers along that line, advising car owners to phone in advance for appointments.

We have looked into the work *Collier's* is doing so that we could tell you about it. Many motorists are already asking for "P.S. Check-Ups" and they expect service men to know what they mean.

Briefly here's the story: For the past several years, *Collier's* has been running a series of car-owner articles under the title of "P.S." (Preventive Service). It has covered every phase of automobile operation and care. In simple language which even we women could understand, it has told us what such things as spark plugs are, what they do and why they wear out.

Today "P.S." is directed to the care of the car in wartime—telling us how to insure long life to our car and how to make it cover all our driving requirements on an allotment of four coupons per month.

We drivers have learned to watch for these "P.S." articles and the tie-in "P.S." signs in service-station windows.

In a recent issue of *Collier's* we were offered a check list described as a guide to our individual car's service needs *now and in the*

(*Continued on page* 56)

MAJOR OVERHAUL JOBS INCREASE

(Number of Shops Reporting Volume of Overhaul Jobs Increased, Decreased, or Unchanged, as Compared with 1942)

	Rural			Metropolitan			Both		
	More	Less	Same	More	Less	Same	More	Less	Same
Midwest	73%	16%	11%	76%	22%	2%	75%	18%	7%
East Coast	64%	33%	3%	72%	28%		67%	31%	2%
South	83%	17%		91%	9%		89%	11%	
West Coast	79%	17%	4%	91%	9%		83%	14%	3%
United States	73%	20%	7%	79%	20%	1%	75%	20%	5%

HOW VOLUME INCREASED

In Shops Reporting Better Business

Increase over 1942	Percentage of Shops Reporting Rural	Metropolitan
5%	2	1
10%	7	10
15%	5	7
20%	21	11
25%	15	26
30%	9	6
40%	14	9
50%	20	19
60%	2	1
75%	2	1
90%	1	1
100%	1	8
200%	1	0
	100%	100%

MOTOR AGE survey reveals that two out of every three automobile shops are busier than at this time last year

RATIONING FAILS T

TO measure the effect of gasoline rationing and other restrictions on the automobile service and repair business, MOTOR AGE early last month completed a nation-wide survey of dealer and independent repair shops. The results reveal a surprising upswing of business in the early weeks of this year as compared with last year.

Returns for the country as a whole showed that 65 per cent of all shops—roughly two out of every three—were doing more servicing and repairing than they were the year before. Of the remainder, 18 per cent were doing an equal volume, and only 17 per cent were doing less.

On the Pacific Coast, the average shop was enjoying a bigger increase than shops in the other sections of the country, with 76 per cent of the shops reporting bigger volume this year than last. Only 10 per cent were below 1942.

The East, as was to be expected, showed the least increase in activity. Only slightly more than half—56 per cent—of the shops were busier than they were at the same time a year ago. Even this showing was better than a pessimist might have looked for, since the survey was made soon after the value of A ration coupons had been slashed to 3 gal. and while the area was still jittery over the prohibition of what the OPA defined as pleasure driving. In only 23 per cent of the East's shop was the stringent curtailment of fuel reflected in dwindling repair volume.

Very little variation was shown between rural and metropolitan shops. The line between the two classes of shops was, for the purpose of the survey, drawn at 10,000 population, shops in towns with populations that high or higher being considered metropolitan, those in smaller towns and communities being considered rural.

Volume of Repair Work Up

(Number of shops reporting volume of all types of service and repair work increased, decreased, or unchanged as compared with 1942)

	Rural			Metropolitan			Both		
	More	Less	Same	More	Less	Same	More	Less	Same
Midwest	65%	17%	18%	62%	20%	18%	64%	18%	18%
East Coast	56%	25%	19%	56%	20%	24%	56%	23%	21%
South	68%	16%	16%	61%	23%	16%	63%	21%	16%
West Coast	75%	12%	13%	79%	8%	13%	76%	10%	14%
United States	66%	18%	16%	63%	18%	19%	65%	17%	18%

TO HALT SERVICE UPSWING

For the entire country, 66 per cent of the rural shops reported larger service and repair volume this year. Of the metropolitan shops, 63 per cent reported improved business. In the East and Midwest, the two classes of shops ran almost neck-and-neck so far as increased business this year was concerned. In the South, the rural shops had a slight edge, while on the Pacific Coast more metropolitan shops reported greater volume.

Increases reported by individual shops ranged from 5 to 200 per cent, but the increases reported by 79 per cent of the rural shops and by 71 per cent of the metropolitan shops range from 20 to 50 per cent.

A good deal of conversation has been devoted recently to discussions of the type of service and repairs that would result from restricting the use of automobiles. Some observers have insisted that today's service consists mainly of tinkering, because owners are uncertain about the prospects for continued use of their cars and trucks. It has been suggested also that tire service has accounted for more than its usual share of service volume. While tire service undoubtedly has grown as the result of compulsory inspections, the fact remains that automobiles are aging and require more extensive repairs than they did when young.

Supporting this contention, the MOTOR AGE survey disclosed that the great majority of shops—75 per cent for the country as a whole—are doing more major overhaul jobs than they were doing a year ago. In metropolitan shops in the South and on the Pacific Coast the number of shops reporting an increase in this type of work amounts to 91 per cent. These figures indicate that motor vehicles not only need major repairs but also that owners are buying it.

Although the difference is not great, more metropolitan shops than rural shops reported an increase in the number of overhaul jobs. Among metropolitan shops, 79 per cent reported increases, while among rural shops 73 per cent were doing more work of this kind. The South and Pacific Coast were much higher than the average, the East Coast below.

Bound for a sweep across enemy territory, these British Spitfires are equipped with the Rolls-Royce Merlin "61" and four-bladed propellers

THE SPITFIRES' NEW ENGINE

Details of the Rolls-Royce Merlin "61" which

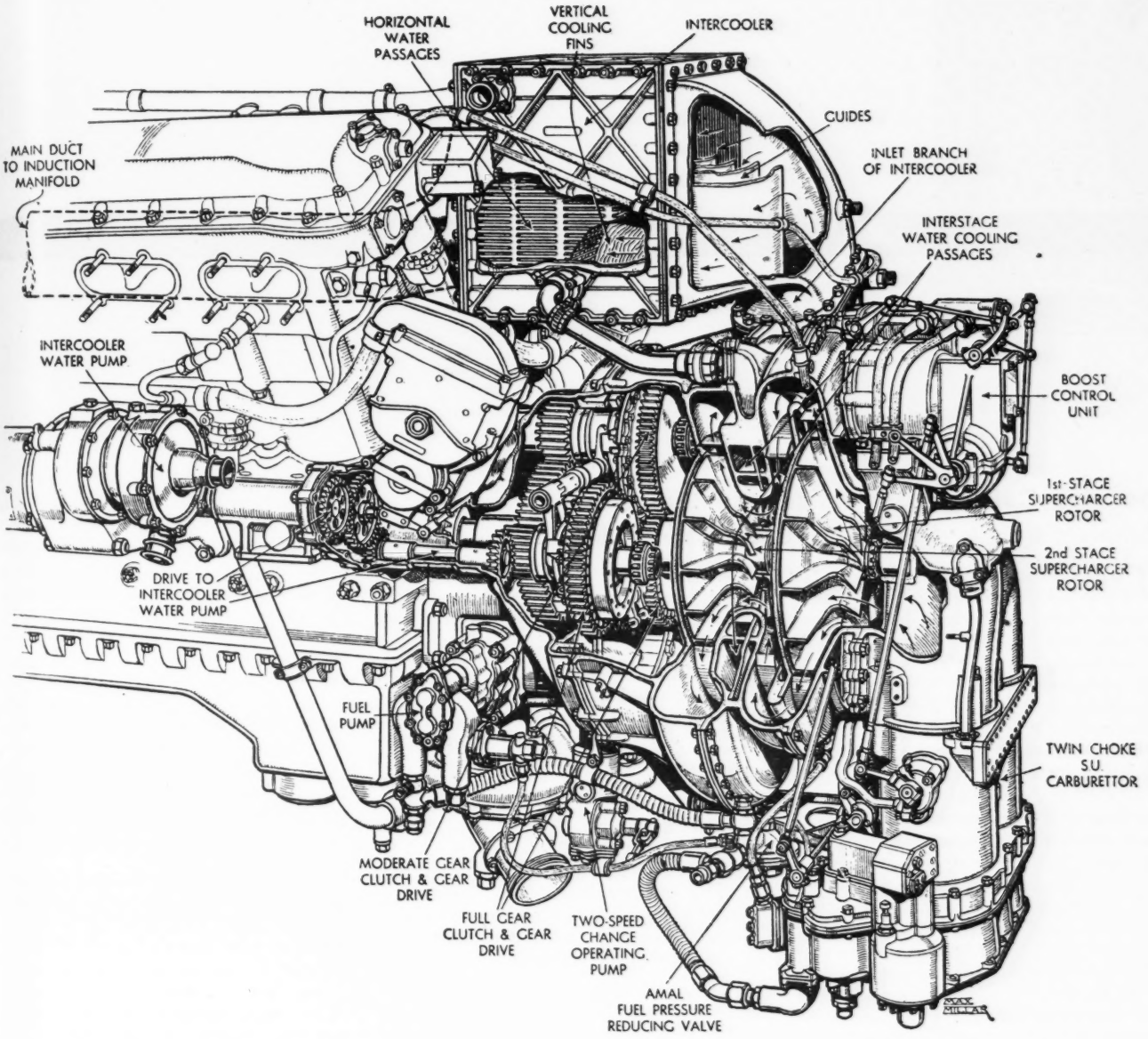
BY M. W. BOURDON

OF the same basic design as the series of Merlin engines that have been current for roughly 10 years, a version that represents a big advance in performance and operational scope without increase of piston displacement has been produced by Rolls-Royce engineers. Known as Type 61, the outstanding difference between this new engine and the Merlin XX is in the provision of a two-stage supercharger with two speeds and an intercooler between supercharger and the induction manifold.

Although no information as to the power output of this new Merlin has been released for publication, it is stated to develop roughly twice the power of the original Merlin III (The Merlin III rating is 990 hp.; the Merlin XX, 1260 hp. —*Ed.*), and to give the latest Spitfire fighter, to which it is fitted, with a four-blade propeller, a ceiling of upwards of 40,000 ft. At that altitude it is said to operate on a charge compressed to six times the surrounding atmospheric pressure. Although the two-stage, two-speed supercharger and intercooler provide their principal benefit at high altitudes and have been devised and adopted chiefly on that account, they have advantages that can be interpreted also as improved performance at relatively low altitudes.

The two-stage supercharger is located in the same position as the corresponding unit on the Merlin XX engine (at the rear) and is driven similarly through clutches and either of the two-ratio gear trains, with speed change effected by a hydraulic pump. Air is drawn through an improved and larger S.U. updraught twin-choke carburetor. The mixture is then compressed in the first stage through a centrifugal rotor of large diameter, and then passes on for further compression through a smaller rotor on the same shaft as the other. At this point the compressed mixture has attained to a temperature of around 250 deg. Fahr.; this is reduced to about 110 deg. Fahr. by the mixture passing through the intercooler before reaching the induction manifold feeding the two banks of six cylinders.

A square boxlike structure, the intercooler is mounted above the casing of the supercharger and auxiliary drive gears. The box contains a radiator through the horizontal tubes of which liquid coolant is circulated, the mixture passing around and between the tubes. The

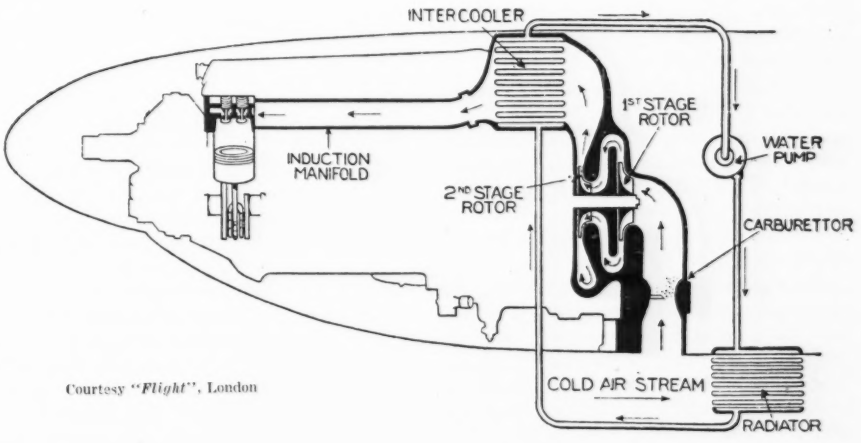


gives Britain's famous fighting planes more power and higher ceilings

consequent reduction in temperature is effected with only a negligible decrease in pressure, it is stated.

The intercooler itself is not directly cooled by air draught, but by the coolant being circulated through an external radiator, which can be located at any convenient point on the engine or the aircraft and which on the Spitfire fighter is installed under one of the wings in a duct wherein also is the engine oil cooler. The engine coolant radiator is located in a similar duct below the other wing. The intercooler coolant is also circulated through water passages in the supercharger

(*Continued on page* 67)



Courtesy "*Flight*", London

Arrows show the path of fuel and air through the two-stage supercharger and intercooler to the cylinders. The location of the supercharger and intercooler on the engine is shown in the cutaway perspective drawing of the Merlin "61" at top of the page.

Service Ceilings Are Raised So Shops Employing 8 or Less Can Pass on Wage Boosts

THE ceiling on labor charges for automotive and farm-machinery repair shops employing eight persons or less have been raised by the OPA.

Authority for this class of shop to up customer charges is contained in Supplemental Service Regulation 6 to Maximum Price Regulation 165, which became effective Feb. 22. This followed by a few weeks an interpretation of the original regulation permitting shops to charge time and one-half for labor for overtime work authorized by the customer.

The effect of the new regulation will be to ease the manpower situation in small shops by permitting them to pay higher wages. Shops employing not more than eight persons were on Oct. 16, 1942, exempted from the President's executive order establishing ceilings on wages and salaries, but any attempt by a shop to raise the pay of mechanics was difficult if not impossible, because ceiling prices had been set on the amount the shop could charge customers. Now the increased labor costs may be passed on. Three methods of adjusting labor charges are permitted by the OPA. The shop, in making the adjustment, may choose the highest of the three following rates:

1. The highest price they actually charged in March, 1942.

2. Twice the average basic hourly wage rate paid in the week which included March 31, 1942, to mechanics performing the service.

3. The March average basic hourly wage rate plus 60 cents.

To the highest of these rates, the shop may add any increase in average basic hourly wage rates which it has incurred since the week which included March 31, 1942. The customers' hourly rate may be rounded upward to the nearest five cents.

A further provision permits a shop to adjust the customer charge after days, thus enabling the shop to cope with higher wage rates.

A shop that makes an adjustment of its customer labor rate must post a conspicuous sign showing the new hourly rate. The sign must be worded as follows:

Authorized Hourly Rate for labor
(To be used in determining our maximium price for service)

	New Hourly Rate
Automotive repairs	$.....
Farm equipment repairs	$.....

This rate is in accordance with OPA regulations. The calculations on which it is based are available for inspection during regular business hours.

The calculations referred to are to be made on a form prescribed by the OPA. This has space for the various factors entering into the adjusted customer charge. The form is included in the announcement of the new regulation, copies of which may be obtained from the OPA. It is not necessary to file the form with the OPA, but it must be kept available for inspection during business hours.

In the case of a one-man shop, where the owner does all the work, the owner may continue to sell at high March, 1942, ceiling, or may use the present permissible ceiling charge of his closely competitor selling the same class of service and employing mechanics to supply it.

The one exception to the regulation for shops employing eight persons or less is that the wages or salaries of persons paid more than $5,000 a year cannot be raised without permission from the Treasury. The National War Labor Board had no power to exempt wages or salaries of this amount from the provisions of the President's executive order.

OPA Lists 102 Operations to Be Done On New Cars and Trucks Before Delivery

IN an amendment to previous regulations that required certain service operations to be performed on passenger cars held in storage, the OPA has added new operations that must be performed before a vehicle is delivered, has extended the ruling to commercial vehicles, and has stiffened the penalty for non-compliance.

Included in the list of 102 specific pre-delivery services, designed to ready the stored vehicles for actual use, are minute inspections, preliminary and final road tests, the remedying of any defects disclosed by these tests, and complete cleaning of the vehicle both inside and out. The seller must supply the buyer with a certificate showing that the maintenance and delivery operations have been performed, and a copy of the cerificate must be filed with the OPA.

Failure to perform the storage operations on a passenger will, as before, forfeit the dealer's right to include in the sale price the mark-up of 1 per cent, or $15, a month since Jan. 31, 1942. Failure to perform the pre-delivery services will forfeit his right to an additional 5 per cent for handling. In the case of commercial vehicles, since it had been the custom to perform the pre-delivery services and include the cost in the seller's maximum price, dealers who fail to perform the services must deduct 5 per cent from the selling price.

So that lien holders, such as finance companies, may have transferred to them cars on which the service operations have not been performed, the new amendment permits anyone acquiring or repossessing to add the 1 per cent monthly allowance on transferring the car to the United States Government, the manufacturer or lien holder, provided the car is reconditioned within one month after the

★ WASHINGTON WHISPERS

date of the acquisition or is sold within a month and thereafter reconditioned in the next month by the person to whom it is transferred.

Dealers with justifiable reasons for failing to perform one or two minor operations may have the requirement waived by the OPA. Application for waivers must be filed with the nearest OPA regional office.

The deadline for completing the operations required for cars in storage has been extended from Feb. 15 to March 15. Decision to widen the list of such services forced the extension, the OPA explained. The WPB, the announcement of the new order states, will have power to seize new passenger cars on which the prescribed operations have not been completed by March 15.

Restrictions Removed from Tire Recapping

FOLLOWING close upon the brush between Rubber Director Jeffers and Army and Navy officials over the allocation of critical materials for the completion of the synthetic-rubber program came the announcement on Feb. 20 by the OPA that virtually all restrictions on recapping would be removed. The two strings attached to the order was that only camelback made of reclaimed rubber would be available for passenger cars, a rule that has been in effect since early in the rationing era, and that the rule would apply only to passenger-car tires and 7.50 x 20 truck tires and smaller.

The new plan provides that any car owner, regardless of the type of ration book he holds, may when he considers that a tire needs recapping simply take it to a recapping shop and have the work done, without applying to his local War Price and Rationing Board for permission.

While no mention was made of the amount of reclaim camelback that is available for recapping, it was as-

(*Continued on page* 73)

★ OFFICIALS CONVINCED

Optimism may be out of order at this time, but it is none the less cheering to read some of the recent government edicts relating to the automobile business and to hear some of the privately expressed opinions of officials. The whole tone is decidedly more favorable to continued operation of our road transport.

There was a time not so many months ago when many bureaucrats were coldly indifferent or actually hostile to the automotive field. One minor official, when reminded that tightening restrictions on gas, tires, and replacement parts might eventually force war workers to lay up their cars, struck a Marie Antoinette attitude and said, "Let 'em walk."

Since that day, mass transportation systems have been shown to be unequal to the burdens imposed upon them by the restrictions on private cars, and officialdom has slowly come to the realization that automobiles must be kept rolling. Several recent moves indicate that they will.

First came the apparent decision of ODT to humanize General Order 21, which was a clumsy effort to ration mileage for trucks. Then replacement parts were given higher and higher priority ratings, until today they rank ahead of most production, with the exception of actual war goods. Next recapping was permitted without specific OPA permission, and now gasoline rations are to be liberalized by giving more fuel to persons driving their cars to work, regardless of their occupation. And, as important as anything that has yet been done, was the upping of service price ceilings last month to let the smaller shops pay higher wages.

All this boils down to the fact that Washington at last realizes that motor vehicles are indispensable to the war effort.

★ GAS OUTLOOK

Expectations are that restrictions on pleasure driving in the East may be relaxed when warm weather comes and the need for fuel oil eases off. That opinion is not shared by some rationing officials. They explain that the Big Inch pipeline from Texas will carry 300,000 barrels daily to the East when completed but that the additional oil and more will be taken by the armed forces. They insist, further, that stocks of fuel oil must be built up during the summer for next winter's use. These men don't seem to care much whether A book holders ever drive again.

(*Continued on page* 78)

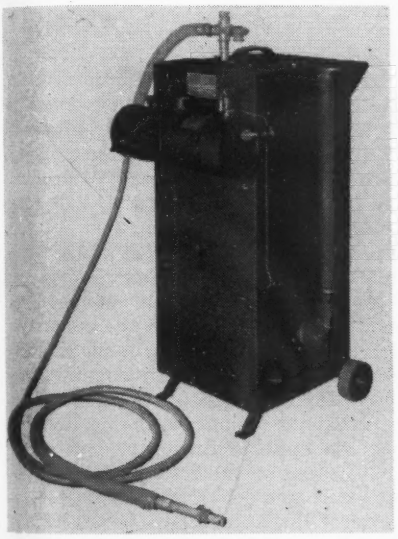
"As soon as I get around one restriction, they ration something else. First it was gas, then tires. Now it's shoes."

NEW profit makers

PARTS TOOLS EQUIPMENT ACCESSORIES

Circo Vapor Cleaner

Circo Products Co., 2835 Chester Ave., Cleveland, Ohio, has announced a new Dee Tee Solvent Vapor



Cleaner, Model HD. This new cleaner has been especially designed for servicing differentials, transmissions, transfer and gear cases. The cleaner provides a constant flow of clean hot Dee-Solv solvent vapors into the housing and around the gears, where the vapors penetrate through the old lubricant to the metal of the gears and housing. The vapors condense on the colder metals, washing and rinsing all inside surfaces free of worn lubricant and foreign particles. The cleaner can also be used for thawing congealed or frozen cases, this operation being performed simultaneuosly with that of cleaning.

The unit is portable and is equipped with an instant light gasoline burner of approximately 35,000 B.t.u. per hr. capacity. The burner is fed from a 1-gal. fuel tank mounted on the outside of the unit.

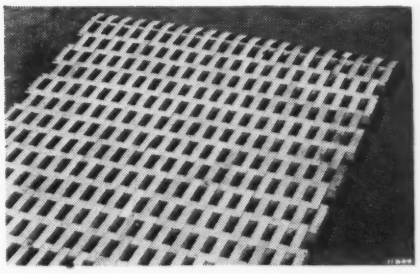
Flexible Wood Link Matting

Flexible Wood Link Matting has just been announced by American Mat Corp., 1785 Adams St., Toledo, Ohio. This mat is substantially constructed of wood links. It is light in weight and can be rolled or folded up for easy handling and cleaning. Lying flat, it follows the contour of the floor.

Flexible Wood Link Matting makes for safety underfoot, is comfortable to stand on, and affords good drainage. The ends are beveled to reduce the danger of tripping. It comes in natural wood color and is inexpensively priced. The mat is 1 in. thick, and comes in stock sizes, 18 in. x 32 in., 24 in. x 38 in. and 30 in. x 44 in., but can also be obtained in special sizes of any length and up to 36 in. in width.

Flexible Wood Link Matting is particularly applicable for use back of counters, in factories, around machinery and on oily and greasy floors.

To help in conserving present matting, through proper care, American Mat has set up a special service and advisory department for the duration. Detailed literature is available for the asking.



New Tail Pipe Tag

The new Tail Pipe Identification Tag of Maremont Automotive Products is now being affixed to every pipe shipped.

The easy-to-read metal tag is ingeniously constructed to fit on any part of the pipe according to the method of stocking used by the jobber or dealer: either end, on the bend, or any part of the pipe.

Easily readability is assured by the time-tested black on yellow color scheme, and the extra-legible type numbers which are repeated three separate places on each tag. Waterproof, grease-proof and oil-proof ink is used in printing the identification tag to assure permanency. Complete model information is listed on each tag, including manufacturer's part number, car name, model and year.

Oil in Jars

Wolf's Head 100 per cent pure Pennsylvania motor oil has adopted a new wartime package—a distinctive 1-qt. glass jar, refinery-sealed to insure delivery of this premium motor lubricant in its original condition.

The convenient, attractive new package has a metal screw top and the familiar "safety-seal" closure to protect its contents. A striking Wolf's Head label in red, green and white identifies the product.

Plastic Spray-Gun Bodies

After many months of development and test, the Eclipse Air Brush Co., 400 Park Ave., Newark, N. J., presents its sprays guns with plastic bodies. The new black plastic gun weighs ¼ lb. less than the spray gun with aluminum body that it replaces. The lighter weight is an important factor in reducing fatigue.

The plastic has good chemical resistance and is not affected by thinners, solvents, paint removers, etc. It is strong, having good impact strength. The smooth black surface is easy to clean and makes a good appearance with its metal fittings.

These guns have been on the job for several months in places where equipment of this type is in constant use under strenuous conditions—shipyards, aircraft factories, munition plants, etc.

Priority assistance is still required to obtain the guns, but delivery is good.

NEWS

SYNTHETIC SLUMPS

ALTHOUGH the second progress report issued by Rubber Director William M. Jeffers reflects the denial of priorities forced upon the program by the WPB, the situation is not nearly so dire as it appeared when the struggle between Jeffers and the armed services was at its height. The reason is that 1943 requirements are considerably less than expected.

ALL RUBBER. The present rubber shortage has stimulated production of all kinds of natural rubber. At top, a Brazilian is tapping a jungle tree with a jebong knife, thus helping to swell his country's growing output. Next below, experts of the U. S. Rubber Co. dig kok-saghyz, or rubber-bearing Russian dandelion, grown experimentally in New Jersey. At left, an ox cart, laden with guayule, rumbles down a mountain trail in Mexico. The rubber-yielding shrub, now cultivated here, grows wild in Mexico.

Plants now building in the United States will have a capacity equal to 78 per cent of the output recommended by the Baruch committee. Those completed during the year will produce synthetic equal to only 241,000 long tons of crude rubber, instead of the 354,000 tons which seemed likely when Jeffers issued his first progress report.

However, an estimate of requirements for 1943 involves the consumption of only 612,290 long tons, roughly equivalent to American consumption of crude rubber in peace times. This consumption will leave a big hole in our stockpile, reducing it by some 340,000 tons in the course of the present year, and leaving us with a dangerously low stockpile of 104,000 tons next Jan. 1. Yet, taking a long view of the situation, the situation is far from being desperate.

The plants now building will, when finished, turn out 813,000 tons of syn-

PAST MEETS PRESENT. A chance encounter on the new U. S. to Alaska highway between husky team and Army trucks.

NAZI JEEP. Captured from the Afrika Korps, the "Volkswagen" is shown beside U. S. jeep. Tests proved latter superior.

DETROIT LETTER

By ***ED WARNER***

thetic rubber annually. This is 200,000 tons above our estimated annual needs, at least for this year.

48-HOUR WEEK

ONLY shops in the areas of critical labor shortages are obliged to lengthen the work week to 48 hours to comply with the recent executive order of the President. There were only 32 areas so designated originally by the War Manpower Commission but others are to be added if the labor situation worsens. The shop operator must keep himself posted as to whether his location is in a critical area.

If the shop is in a critical area, and is covered by the Fair Labor Standards Act, overtime at time and one-half must be paid unless a union con-

(*Continued on Page* 40)

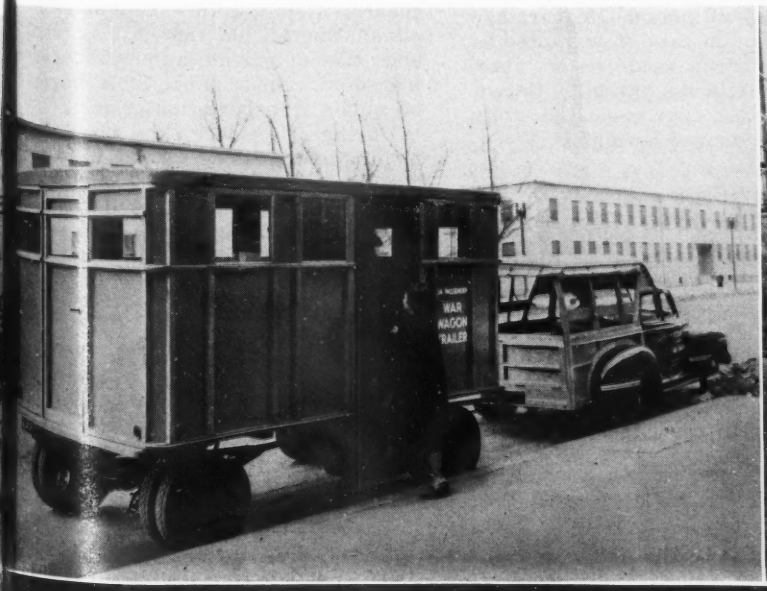
A POTENTIAL market for more than 11 million passenger cars in the spring of 1945 is envisaged by the research experts of one of the independent automobile manufacturers in a recent survey of post-war possibilities. They base their estimate upon the fact that by that time no passenger cars for civilian use will have been produced in three years. Civilian passenger-car production came to a final halt on Feb. 10, 1942. The 536,105 new cars that are being sold on ration certificates since March 2, 1942, are hardly more than a good month's sales in a prosperous automotive year.

Under normal conditions of manufacture and trade-in sales, the market-research experts figure that there would have been 32,600,000 passenger cars in use by 1945 if the war had not interfered. Of that number, 24,300,000, or 75 per cent, would be from one to eight years old and 8,300,000 or 25 per cent, would be more than eight years old. However, with no new cars being manufactured for a three-year period and many jalopies being junked as their usefulness ceases, they figure that only 21,400,000 passenger cars will still be on the road in 1945, of which 11,000,000, or 51 per cent, will be three to eight years old and 10,400,000, or 49 per cent, will be more than eight years.

These estimates take for granted that the war will not be over before the end of 1944, a not unreasonable view when the opinions of war strategists and military leaders are taken into consideration. Of course, an 11,000,000-car market is much greater than the automobile industry could supply in one year, even if all its production equipment were back in peacetime gear. A 3,000,000-car sales year

(*Continued on Page* 60)

WAR TRAILER. This strange vehicle, designed to save rubber and steel, consists of a converted sedan, seating 15 persons, and a trailer coach, seating 24. It was tested recently at Washington.

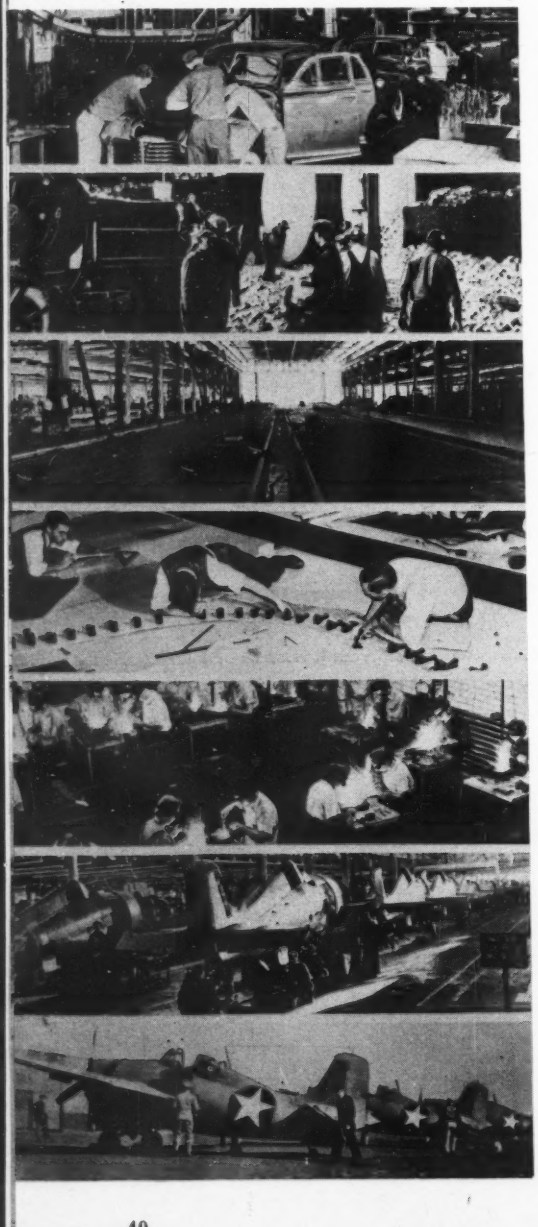


REFINERY SAVES GAS. The comely young lady on the bike is an escort at the Bayway, N. J., refinery of Standard Oil. She shows visiting trucks to their destination, uses absolutely no gas.

NEWS

OVERSHOES. On a Chicago "Tribune" test car, half sections of old tires are fitted over two rear tires to save rubber. Overshoes are installed while tire is deflated.

PEACE TO WAR. Seven steps in converting an automobile plant. 1. Old assembly line of Linden, N. J., plant of GM. 2. Dismantling. 3. Stripped plant. 4. Planning new plant. 5. Training new workers. 6. New aircraft assembly line. 7. Flyaway.



tract exists, in which case the terms of the contract remain unchanged. If the shop is not covered by the Fair Labor Standards, it is necessary to pay only straight time for extra hours for hourly employees. If the employee is salaried, the Fair Labor Standards Act requires that he be paid at time and a half if the salary is less than $50 a week. If he is paid more or the shop is not covered by the act, he must work the longer hours at no increase in salary.

GUAYULE

THOUGH the quantity is small, the first natural rubber to be produced on a commercial scale in the United States since Pearl Harbor is now being harvested in California and the Southwest. The rubber is contained in guayule, the desert shrub which is now being dug, baled, and hauled to the factory. Present estimates are that 600 tons of rubber will be extracted and turned over to the Rubber Reserve Co.

The area from which the shrub is being harvested approximates 550 acres, indicating a yield of a little more than a ton per acre. The age of the guayule plants being dug is not given by the OWI, which makes the announcement, so it is impossible on the basis of this year's production to check on the estimates made a year or so ago, which ranged from a half ton an acre for year-old plants to two or three tons for older plants. The initial harvest does indicate, however, that the production of natural rubber is practicable and that it is limited only by the acreage devoted to guayule.

An interesting point is made by the OWI in connection with the attention being given the shrub. The Army made a study of guayule 13 years ago and said that in case of war production of the shrub would be of "inestimable value to the nation." One of the two officers that made the study was a major named Dwight D. Eisenhower.

NUGENT OPPOSED

BASING its stand on an analysis by Dr. Harold G. Moulton, of the Brookings Institution, the National Automobile Dealers Association has aligned itself against the Nugent plan of prepaid buying of post-war consumer goods, including automobiles. The plan, as noted last month, would permit buyers to obtain priority ratings on durable goods produced after the war by making installment prepayments during the war. This method, it is claimed, would build up a backlog of demand to tide business over the transition period between war and peace, would enable manufacturers to gage their post-war markets more accurately, and would check inflation.

In his analysis, Dr. Moulton denies the validity of such claims. An abnormal increase in consumer demand after the war, he holds, would increase post-war inflationary dangers.

"The author," declares Dr. Moulton, "seems to think that without the plan the purchasing power for durable goods after the war would be inadequate. Our past history affords no support for this view. The author also forgets that, as a result of the liquidation of existing installment commitments, we shall have the possibility of a very great expansion of the installment purchases starting from scratch. The conclusion seems to be that there is little danger that we shall have a lack of purchasing power with which to obtain durable consumer goods after the war, provided the goods are offered on a sound price basis. The Nugent plan, if successful, would thus be harmful in this connection."

TRANSIT TAXED

ALTHOUGH its figures were compiled for the purpose of justifying a proposed shift of transit equipment to war centers, a recent release from the Office of Defense Transportation emphasizes in a rather startling way the dependence of the country on individual motorized transportation. The ODT figures show that country-wide gasoline rationing, by eliminating all but the most essential operation of private automobiles, has placed an almost impossible burden on public transportation systems.

During December, the first full month during which nation-wide rationing was effective, the number of passengers carried increased tremendously, as compared with the same month of 1938.

In Charleston, S. C., transit-line riders increased 622.1 per cent, as compared with December, 1941. The increase in Wilmington, N. C., was 522.3 per cent. These are extreme cases, and it is difficult to understand

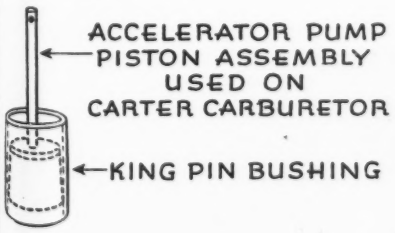
(*Continued on Page* 80)

★ SHOP KINKS ★

Here's your chance to pick up a little cigaret money. We'll pay five bucks ($5.00) for every Shop Kink accepted and printed. So send 'em in to us—some short cut you use in doing a job easier and quicker than the other fellow—some special tool you made when you couldn't buy one to do the job—and we'll do the rest. Incidentally we won't accept any that have previously appeared in any other automotive publication. Here are some that were accepted this month

Installing Carburetor Piston

To facilitate the installation of the accelerating-pump piston on Carter carburetors, I slip a king-pin bushing from a Chevrolet over the leather washer, which compresses it and allows it to enter pump body very easily.—*Alva H. Zentner, 862 N. Chatham St., Janesville, Wis.*



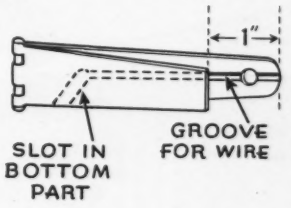
Fuel-Line Anti-Freeze

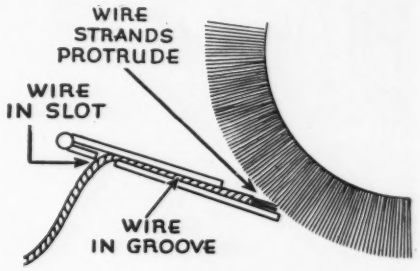
Gasoline isn't what it used to be, since the jeeps and the tanks started getting the cream of the crop, and the boys in the colder sections of the country are having plenty of trouble with frozen gas lines. Water, of course, separates from the gas and settles in the low sections of the gas line and in the fuel pump, and freezes. You can thaw out the lines, of course, but why go to all that trouble? Just tell your customers to add a pint of alcohol to each 10 gal. of gas, and their troubles from freezing will be over. Alcohol, like water, is heavier than gasoline, and will tend to separate from the gas and mix with the water, keeping the water from freezing.—*Robert Hankinson, Detroit, Mich.*

Cleaning Stranded Wire

The use of a rotary scratch brush is by far the easiest and most effective means of thoroughly cleaning the bared ends of stranded-wire cord or cable, preparatory to splicing or soldering on terminal lugs. If a rotary brush is not available, an ordinary steel-bristle hand brush is a good substitute.

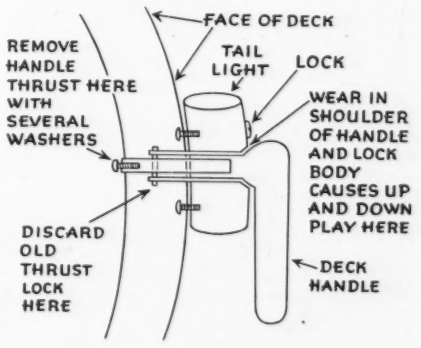
To make it easy to hold the strands against the wheel or brush, a tool can be made from an old hinge, as illustrated. One arm is sawed off about 1 in. shorter than the other. A shallow groove is filed or ground down the middle of the long arm and a slot is cut from one side a little below the junction end. To use this tool, slip the wire end into the slot and pull it down until the bared end is forward of the short leg of the hinge when it is closed. This grips the wire firmly and the strands can be brushed clean without danger of injury to the fingers. If a hand brush is used, lay it bristle up on the bench and run the tool and the wire down its length a few times.—*W. C. Wilhite, Carlinville, Ill.*





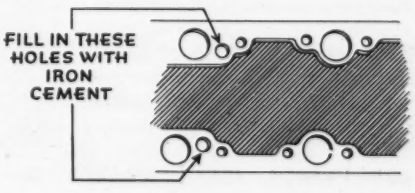
Overcoming Rattle

I have found that, on cars equipped with combination tail light and handle on the rear deck lid, the handle gets very loose and causes a decided rattle. To overcome this condition, I install a bronze bushing from a Ford V-8 water pump in the tail-light housing, discard the old thrust lock and reinstall the handle. This makes a very effective repair.—*Preston R. Coleman, 128 Wayne Ave., Norristown, Pa.*



Manifold Repair

I have had three Lincoln-Zephyr cars come into the shop with holes eaten through the manifold into the exhaust ports. To repair these, I take a can of iron cement and fill the inside of the hole full and let dry for 24 hr. Then I file the surface smooth and replace the manifold and the car performs perfectly again.—*C. E. Richardson, 1019 Front Ave., N.W., Grand Rapids, Mich.*



WE, TOO, ARE FIGHTING THE WAR
ON TWO FRONTS

A Great River *of warplane pistons flowing from production lines in the Hudson Aviation Division...symbol of Hudson's part in the war effort.*

OUR first front is war production. Until the day when the Axis powers are defeated—when there is no need for more of the war matériel that all Hudson plants are turning out—we shall stick to the battle of building the *best* and the *most* we can for victory.

Our second front is the home front . . . providing reinforcements to Hudson dealers to help them prevent any interruption of essential wartime driving.

Long before the Jap attack on Pearl Harbor, we planned to arm and equip Hudson dealers so that they might give prompt and efficient service to Hudson owners under wartime conditions.

Service facilities were expanded and modernized; and an effective system of parts distribution was set up, through a nationwide chain of parts depots, to provide necessary parts *where* they may be wanted—*when* they may be wanted.

As a result, Hudson dealers are—today—exceptionally well equipped to keep owners' cars in tip-top operating condition.

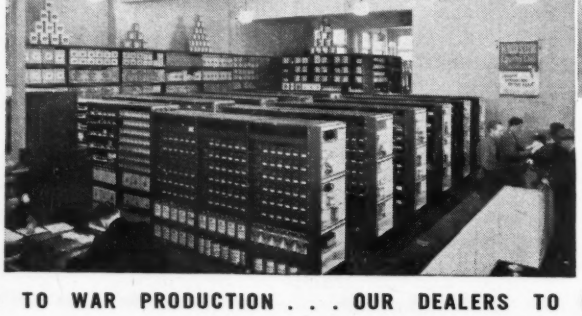
Husky Hudson Invader Motors *speed the invasion activities of our armed forces. Above—one of the many powerful marine engines that regularly roll from Hudson assembly lines.*

ARMY (E) NAVY

Hudson Aviation Division Wins Army-Navy Award for High Achievement in War Production

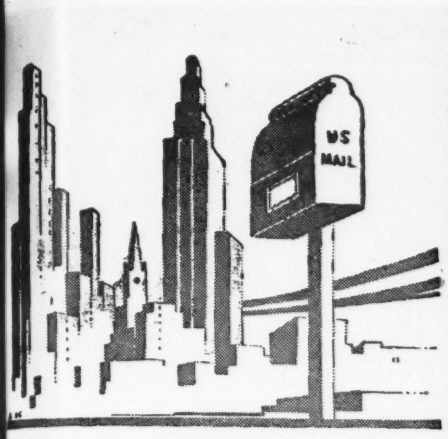
HUDSON
MOTOR CAR COMPANY
DETROIT, MICHIGAN
33 Years of Engineering Leadership

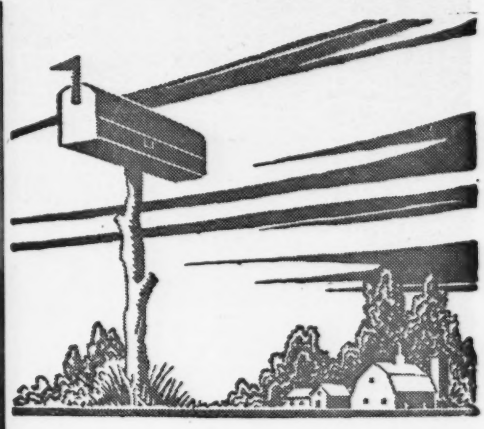
Air Power Speeds the Great Day! *Hudson is happy to be helping with mass production of wings and motor units for Curtiss-Wright Hell Divers and vital sections for Army bombers.*



Long-Range Planning *has made it possible for Hudson to offer dealers complete parts service so vitally needed under war conditions. Hudson dealers are ready and equipped to "keep 'em rolling."*

OUR PLANTS ARE DEDICATED TO WAR PRODUCTION . . . OUR DEALERS TO MAINTAINING WAR TRANSPORTATION





Bill Toboldt, Editor, Motor Age

THE READERS'

CLEARING HOUSE

of Servicemen's Queries

Dissolving Gum

We have a car that has not been used since 1934. The gas in tank and carburetor has all turned to gum. Please advise what can be used to dissolve the gum deposits. — Otto Fischer, Bouckville, N. Y.

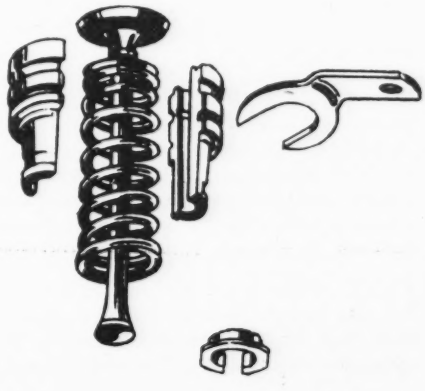
ABOUT the best thing you can use to dissolve the gum in the gas tank and carburetor is acetone. This is rather difficult to get in some places but the larger paint stores will have it in stock.

Breaks Springs

We have had considerable trouble with valve-spring breakage in a 1940 Lincoln-Zephyr. In some cases we find broken springs after only about 5000 miles of driving. Can you advise us what the cause might be and how to remedy this trouble?—A. Ferreira, Attleboro, Mass.

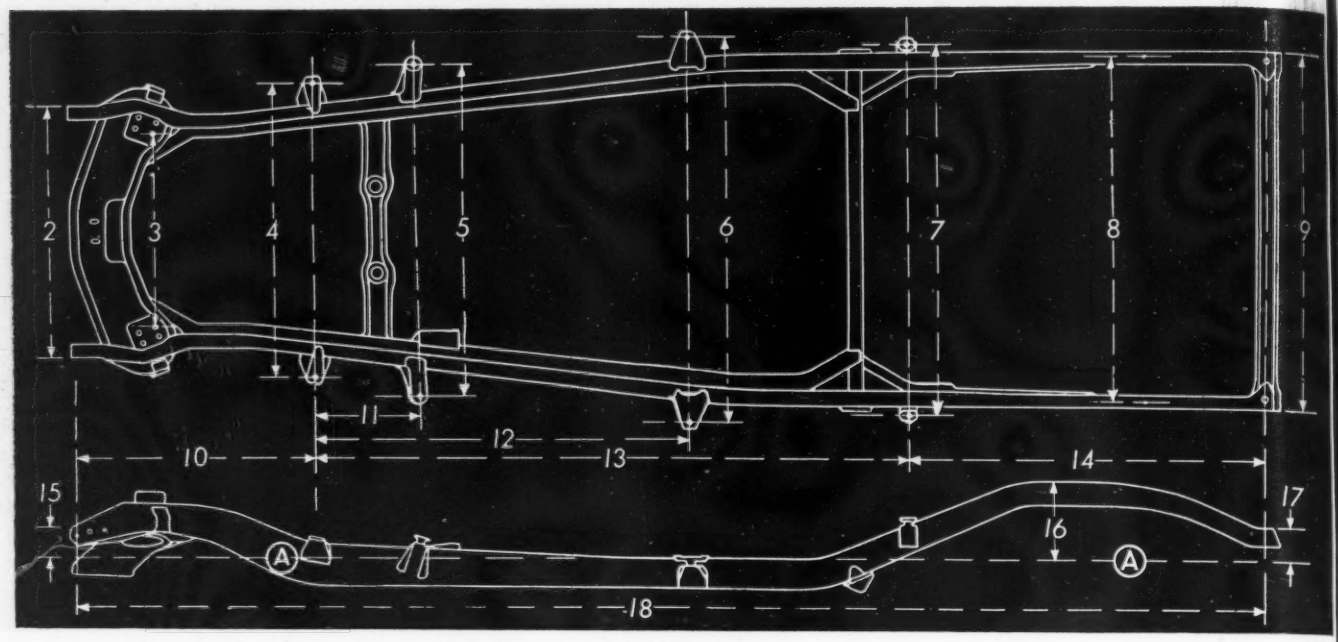
THE most probable cause of the trouble of the excessive valve spring breakage you are experiencing on the Lincoln-Zephyr is a water leak from the water jacket so that water finds its way into the valve chamber. This results in an acid formation in the crankcase which quickly attacks the valve springs causing premature breakage.

I would suggest that you install new head gaskets and also make sure that there are no cracks in the water jacket which would cause your trouble. I would also like to point out that you might get a lot of moisture in the crankcase as a result of condensation. This would be greatly increased if the car is used on short trips, so that the engine would not really get up to full operating temperature. Be sure to drain and flush the crankcase so as to be sure to eliminate all moisture which might be present.



Timing Chain Jumps

I have a 1928 6-cylinder Packard, known as the Little Six, on which I am having trouble with the timing chain. It seems to be lack of lubrication, as new chain was installed and after about 4000 or 5000 miles it jumped time. I set it again and all the slack was removed, but in a short while it jumped again. This time I took out a link or so and again it jumped after a few thousand miles. Each time I take off the case, it looks like there is little or no oil getting to the chain, also there is quite a bit of sludge in the case. I cannot find any place for oil delivery to the chain. Please tell me if there is an oiler or



Frame Diagram 1942 Dodge

A—top of frame
2—35 in. (7 pass. 35 3/32)
3—36 25/32 in.
4—40 17/32 in. (7 pass. 40 19/32)
5—45⅝ in. (7 pass. 45 23/32)
6—53 in. (7 pass. 53⅝)
7—50½ in.
8—46¾ in.
9—48¼ in. (7 pass. 48 11/32)
10—33 45/64 in.
11—14 43/64 in.
12—51 59/64 in. (7 pass. 60 31/32)
13—81 29/32 in. (7 pass. 99 29/32)
14—48⅞ in.
15—4 1/32 in.
16—10 13/16 in.
17—4⅞ in.
18—164 31/64 in. (7 pass. 182 31/64)

pipe to oil the chain. Have a good oil pressure on gage, about 30 lb. at 30 m.p.h.—E. H. Anton, Memphis, Tenn.

I AM inclined to believe that you are right about lack of lubrication to the timing chain on the 1928 6-cylinder Packard. I think the lack of lubrication is due to the passage in the camshaft being stopped up. Oil is fed to the four camshaft bearings under pressure and on to the timing chain through two holes in the hub of the cam gear. It is also possible that the camshaft bearings are worn to the point that no oil is carried through the shaft to the chain.

I would suggest that you thoroughly clean all the oil pasages and then put a pressure test on the system to be sure that oil is being delivered to the chain.

Firing Order

Please give me information about the firing order of all the gasoline motors, fours, sixes, eights, twelves, and sixteen cylinder engines—Ben Takemoto, Poston, Ariz.

THE firing order of American straight eight engines is, 1-6-2-5-8-3-7-4. Six cylinder firing order is 1-5-3-6-2-4.

On V-8 engines there is more variation. The Lincoln-Zephyr V-12 engine the firing order is 1-4-9-8-5-2-11-10-3-6-7-12. The left cylinder block has the odd numbers starting at the front. The firing order of the V-8 Ford is 1 right, 1 left, 4 right, 4 left, 2 left, 3 right, 3 left, 2 right.

The firing order of the V-12 Cadillac is the same as the Zephyr or 1-4-9-8-5-2-11-10-3-6-7-12, and the left bank is numbered with the odd numbers and the right with the even numbers. The Cadillac V-8 firing order is 1 left, 4 right, 4 left, 2 left, 3 right, 3 left, 2 right, 1 right.

Points Burn

Will you kindly give me some information which will help me locate the trouble I am having with several cars that burn the points regularly every couple of weeks? I have checked and rechecked the condensers on a tester and they test O.K. in every way. In each case it is just the arm which burns. The stationary point stays in very good condition. I have checked the wiring for loose connections, thinking that there might be a loose connection between the generator and battery which sets up a resistance and sends too much current through the ignition system, but have been unable to find such a condition.

One car was a Hudson 112 which does not have an ammeter, so I installed a voltage regulator, thinking that perhaps the generator was at fault. This helped considerably but it still burns the points up in 1000 to 1500 miles, which is too often. I would appreciate some information which would help me out of this trouble.—E. J. Mayell, Cohoes, N. Y.

ONE of the most probable causes of the rapid wear of breaker points that you have been experiencing is excessive voltage, and I would suggest that you check the voltage at the breaker points. Of course, this should be checked with the engine running at a speed sufficiently high that the generator is charging. The most probable cause of excessive voltage would be found in the generator or in the adjustment of the voltage regulator.

There is also a possibility that the difficulty is caused by a condenser of incorrect capacity, or one that is partly shorted. I would recommend that you install a new condenser, making sure that it is of standard make and of the correct capacity. Of course, a kick-back from a defective coil could also cause your trouble.

However, the only way to be sure is to check the voltage at the breaker points.

Poor Mileage

I am working on a 1938 Studebaker Commander, six-cylinder. This particular car has been getting very poor gasoline mileage. The first thing I did was to give this car a complete tune-up. It improved the gas mileage from 7 miles per gal. to between 10½ and 11 miles per gal. It also improved the performance of the car. Later, I installed a new set of spark plugs. That was as far as I could go, being handicapped by lack of tools and proper equipment.

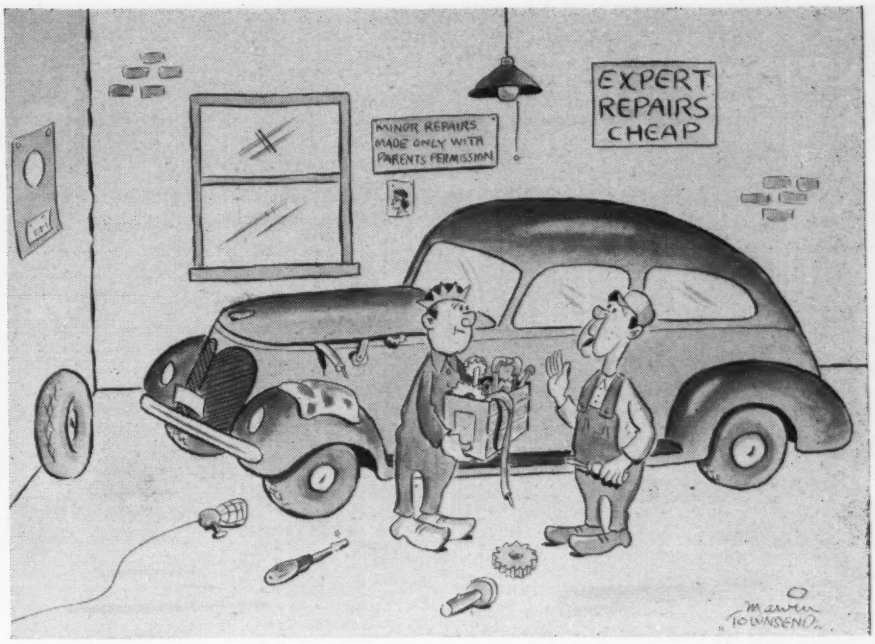
I took the car to a reputable United Motors service station, having it overhaul the carburetor (could not get a new one), distributor, install new points and condenser. It got the

whole works. The performance was improved still more, but no improvement in gas mileage. Compression reading is about 95 lb. in all the cylinders. I have never asked for information of this sort before, as I have always managed to solve my own problems. Any advice or information concerning this problem would be greatly appreciated. I thought I would grind the valves regardless of the uniform compression reading. What do you think?—Matty S. Camera, U.S.M.C.R., Washington, D. C.

YES, I agree with you that the first thing to do would be to do a real carbon-and-valve job on this car, for while the compression is uniform it is still 10 lb. under specified value. According to specifications, this car should have 105 lb. compression in each cylinder. Regardless of what else you do, unless you have maximum compression you won't get maximum gasoline mileage. I would also strongly recommend that you use SAE 10 or SAE 20 in the crankcase, preferably SAE 10, as this will give you at least two or three miles more per gallon of gasoline, in addition to easier starting.

Since you have had the distributor and carburetor overhauled, there is nothing much more you can do, but on the carburetor I would put the accelerating pump in the shortest stroke and, in regards to the distributor, I would set this as far advanced as possible without getting any ping from the engine. I think it would also pay to increase the spark-plug gap .002 or .003 above standard setting. This will also improve gasoline mileage.

Of course, you should also check brakes to make sure that they are not dragging and that the clutch is not slipping. Also be sure that the wheels are properly aligned and that wheel bearings are not tight. You want to be sure that there are no intake manifold leaks, and also that the automatic choke is correctly adjusted. This choke is particularly important for if it tends to remain closed longer than necessary your gasoline mileage will be completely haywire.



"Forget it! We're bound to have a few parts left over now and then."

Miss in Buick

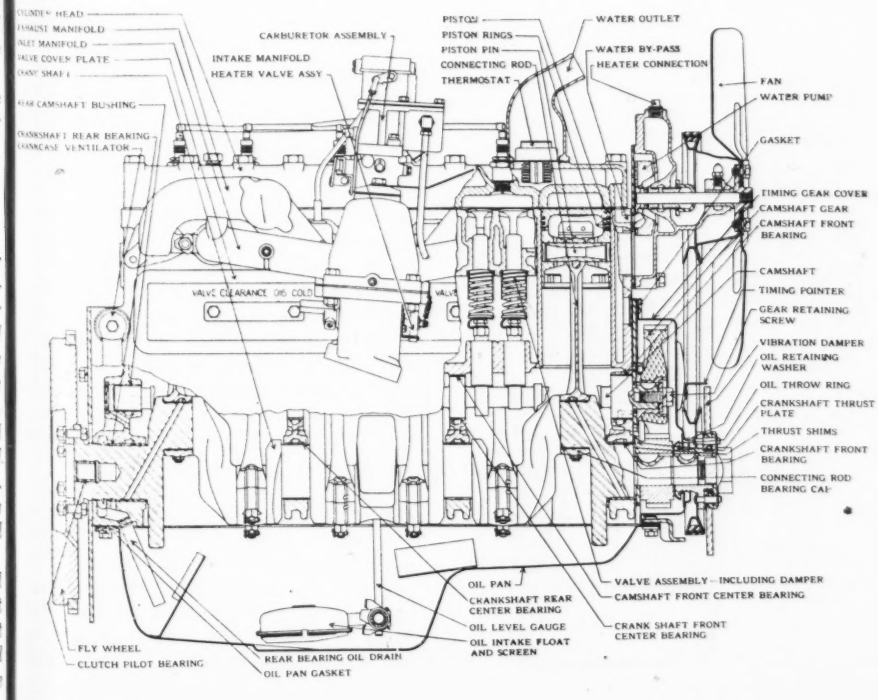
I am having trouble with a 1942 Buick. The owner bought the car new. After 2,000 miles, it was losing oil, pinging, had slow pick-up and a miss in the motor. We checked the ignition, but couldn't find miss. It was completely overhauled with rebore and complete new ignition. Then the car ran well for 5,000 miles. Now the trouble is that it has a miss in it. I put new spark plugs (manufacturer's specification), new points, new wiring, new distributor cap, and checked the coil and condenser. They were good. After testing it, it still had a miss. Then we gave it a carbon and valve job. The car then ran all right for 500 miles. Now it has a miss in it. Could you tell me what the trouble is?—Alfred D'Antonio, Philadelphia, Pa.

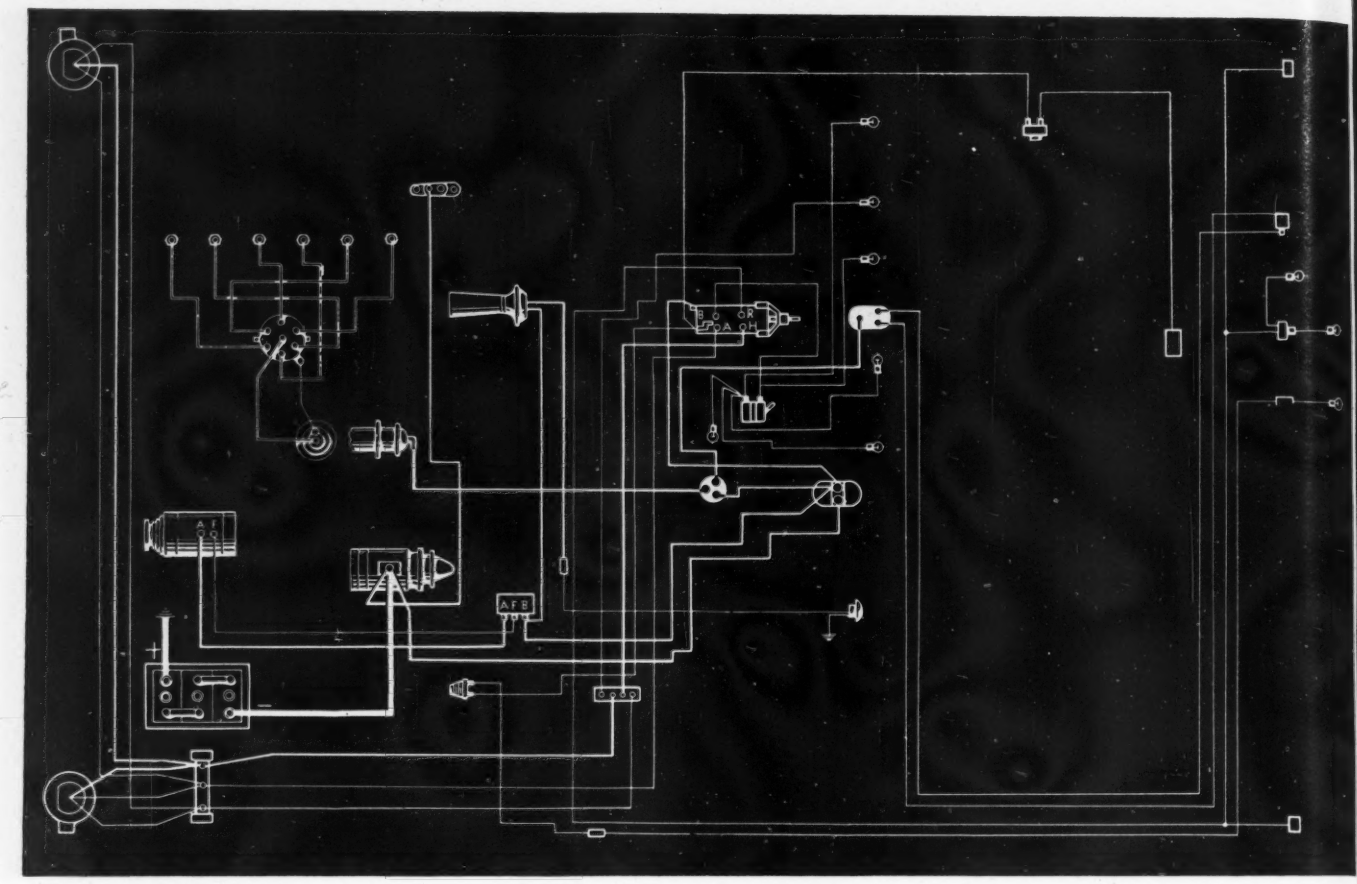
AFTER carefully reading your letter in reference to the trouble you are having with a 1942 Buick, I am inclined to believe that, first of all, your trouble is most likely to be caused by sticking valves.

I would recommend that you use some valve oil through the carburetor of this engine and also be sure that only light oils are used in the crankcase. In addition, since you are allowed to drive only 35 miles an hour, I think it might be advisable to increase the spark-plug gaps a few thousandths over standard.

I am assuming, of course, that the checking of the ignition system has been carefully done and that you also have checked the carburetor. In connection with the carburetor, make sure that the float level is correct and also that the two carburetors are correctly synchronized.

While you did not mention the type of oil you are using in this engine, I am inclined to believe it is the type that is more likely to cause the valves to stick and possibly you should use





Wiring Diagram, 1942 Dodge

another brand. But make sure it is not heavier than SAE 20, preferably SAE 10 for this season of the year.

Master Cylinder Removal

Will you kindly send me information on how to remove the master cylinder from a 1940 Chevrolet passenger car?—Mike Panek, Salem, Ore.

WHILE the master cylinder on the Chevrolet is rather awkward to remove, you should have no trouble once you have disconnected the brake pedal and, then with this shoved up through the floor board, you should have no difficulty in removing the master cylinder from below.

Curing Knock

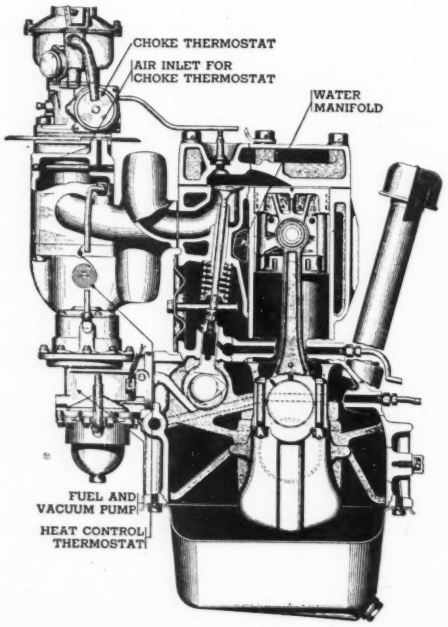
A couple of issues back I was very much interested in an item concerning a knock in a Packard. I know just how a mechanic feels after he has ripped a motor down twice to find a knock that he though might be a connecting rod.

Let me tell you some symptoms. The motor has a very distinct metallic knock on a pull. Short out No. 4 spark plug and the knock disappears. I'll tell you a way to make the knock disappear without shorting out a plug. Just put your hand against the carburetor and push. The knock will then go. You start all over again shorting out plugs to find the knock, but no luck.

If you take a 9/16 in. wrench, tighten the two bolts that hold the fuel pump on, all the connecting rods, wrist pins, and pistons become tightened. No more looking necessary.

The above is the result of two days of hard work trying to eliminate a knock in a Packard. So tell G. Scheaffer of Doylestown, N. J., that I believe that is where the trouble is in the 1938 Packard which he describes.

I will be very much interested to know whether this proves to be the case.—Joseph R. Varrieur, Brockton, Mass.



Stubborn Oil Leak

We have a 1939 Cab-over-Motor Chevrolet truck that leaks oil out through the dust pan. The rear main bearing is tight and sometimes, when it stops, it pours out a puddle of oil. There are no outside leaks on the motor. It is worse going up a hill. We took ball out of oil return on rear main bearing but it didn't help. This is a new motor. Could you advise what is wrong with it?

We have had some Ford V-8 motors with broken pistons when the motor is in good condition. This seems to occur most in cold weather and there has been no sign of water in them. What would cause this? There is practically no taper in the motor.—W. W. Fischer, Nyssa, Ore.

ON the 1939 Chevrolet truck engine which leaks oil out of the rear main bearing, I would suggest that possibly the leak is not from the main bearing as you describe but possibly from the camshaft rear bearing. As you know, this bearing is sealed with

a large welch plug and sometimes this becomes loose and the result is that you have a severe oil leak, which is often mistaken for a rear main bearing leak. The only way you can check this is by removing the flywheel.

If this is not your trouble, there is a possibility that your main bearing is badly worn or the crankshaft journal is badly worn. The only way to check this, of course, is by removing the crankshaft and measuring with micrometer. Sometimes if you have excessive end play in the crankshaft you will also get a bad bearing leak as the crankshaft floating back and forth will damage the oil slinger at the rear main.

It is rather difficult to say what would cause a piston to break on the Ford V-8 if everything is in good condition. Sometimes this is caused by having wrist pins which were fitted too tight. Unevenly tightened cylinder-head bolts will also contribute to this condition. Probably the most frequent cause for broken pistons is running the engine too fast in low gear or while coasting.

Increasing Camber

I have a Nash, Series 4140, and would like to know how to increase camber on both sides. The use of a longer tie rod is not advocated by the Nash people. Can you help me?—Ernie's Garage, Indio, Cal.

IN regard to increasing camber on both sides on a 4140 Nash, the Nash company states definitely that increasing camber on one side decreases it one the other and this is obviously the case when you consider the system used. If it is absolutely necessary to increase camber on both sides, all you can do is install a longer rod connecting the upper end of the suspension unit.

However, by means of the angle rods on each side of the car it is possible to adjust these so as to obtain an equal amount of camber on both sides. To do this, first disconnect the suspension unit tie rod, which passes over the engine, and then adjust the caster rods on both sides until you get equal camber on both sides.

As I said before, if it is necessary to increase camber on both sides, the only way it can be done is to increase the length of the upper tie rod. There is no adjustment provided for this and the only thing that can be done is to cut the rod and weld in the required additional length.

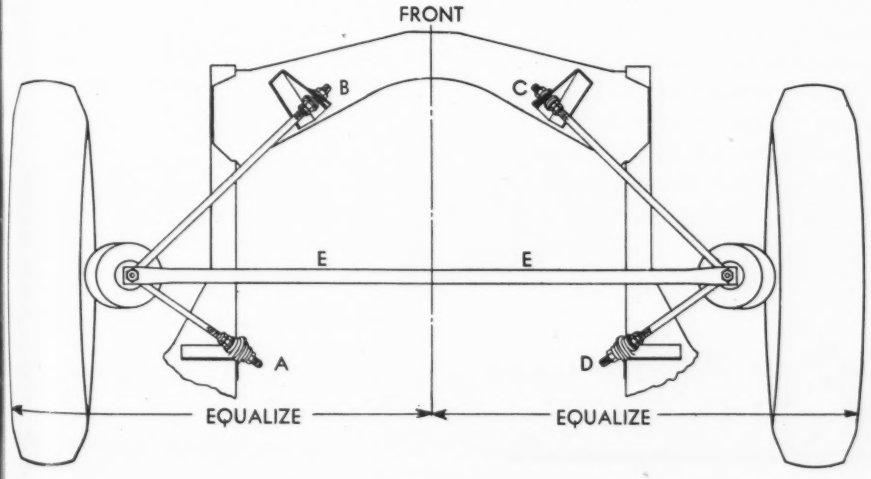
Oil Pressure Drops

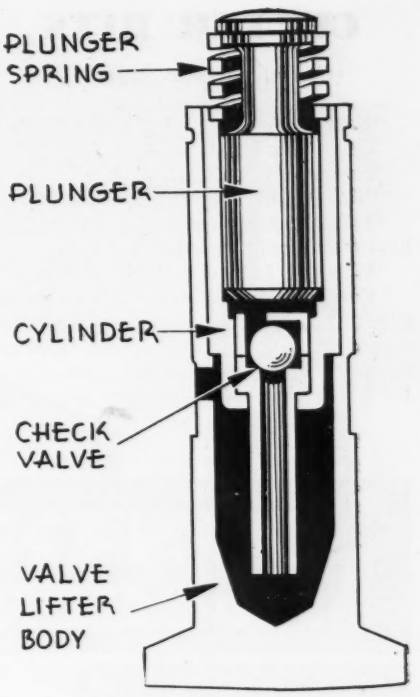
I have a 1927 Chrysler "70" motor in a boat. This motor was overhauled about a year ago, starts and runs perfectly, but I have been concerned about the oil pressure. When started cold, the pressure rises to 30 lb. or over but falls off to 10 lb. as soon as the motor is warm, then drops to about 5 lb. if the motor is run continuously. The motor uses no oil but is operated with a rather heavy load. I estimate the maximum r.p.m. that I can get when under way is between 2500 and 2800.

I have run steadily for eight hours at three-quarter throttle and the pressure does not drop to zero at any time. I would like to have greater oil pressure so that the filter would clean the oil. At present, the pressure will not force enough oil through the filter.

I have cleaned the ball check and stretched the spring on the starter side of the engine, thinking this might raise the pressure but it did not effect it. What do you suggest that I do to raise the oil pressure? R. McGowan, Route 6, Box 145C2, Tacoma, Wash.

I AM inclined to think the oil pressure trouble you are having with the 1927 model 70 Chrysler motor is due to excessive clearance in the main or rod bearings. I would suggest that you make an oil-pressure test on the bearings to determine the point at which the loss occurs. When making this test, the bearings should show an oil drip at the rate of 25 to 50 drops per minute. If a steady stream of oil comes from the bearings, the clearance is excessive and should be corrected.





Noisy Valve Action

Recently I ground valves and installed new lifters and plungers on a 1937 La Salle engine. After assembling, the valve action was very noisy. It remained noisy for about 200 miles so I took all parts out and washed them carefully. Again assembled motor. Result, as much noise as before. Consulted local Cadillac Co. and was told to remove valve action and wash carefully. Performed this job and valves are still noisy. Any suggestions will be highly appreciated.—E. J. Hevie, Arlington, Va.

FIRST of all, the difficulty you are experiencing with a noisy action on the 1937 La Salle might have been caused by the mixing of the parts. The plungers and dash pots are not interchangeable. The number on the dash pots casting should correspond to the number etched on the plunger. If you mixed these up when you did the carbon and valve job, it is quite probably the cause of the troublesome noise.

Another cause of noisy action is high oil pressure, which may lift the entire hydraulic unit against the plunger spring, permitting excessive plunger movement and wear. Low oil pressure permits oil release leakage between the plunger and the cylinder to exceed the oil feed to the ball check. Oil pressure at the supply pipe should be 3 to 5 lb. when the gage on the instrument board reads 12 to 15 lb.

If, after checking these points, and you are absolutely sure the mechanism is clean, the trouble is undoubtedly due to worn parts or the fact that you have mixed the plungers and dash pots.

CUTTER BITS

(*Continued from page* 25)

"Hmm. Are you busy right now?"

"Of course I am."

"I mean on rush jobs."

"No, nothin' like that. Why?"

"I thought we'd get this cutter bit business straightened out."

"What've I done now?"

"You know," said Pop, "it's a shame you ain't about 30 years younger, so they'd take you in the Army. You're about the fightinest man I know."

"If we was both 30 years younger, you'd still be too old for the draft."

"You win again," said Pop, laughing. "Now let's talk about cutter bits. Now that you're a machinist I oughtn't to have to lead you around by the hand any more. You ought to know how to grind bits yourself."

"That means you're gonna teach me?"

"I'm gonna try. And the first thing you've got to remember is that dull tools make a sloppy machinist. It may now look the same, but a lathe tool cuttin' metal is actin' exactly like a knife cuttin' wood. Both of 'em actually wedge off the material. You know how you'd make out with a dull knife.

"On heavy cuts, the cuttin' edge don't have to be quite as keen, because a ridge of metal builds up over it and this false edge actually does the cuttin'. But on soft metal or finer cuts like we do here, the edge has got to be sharp."

"I guess I can take care of the sharpenin' all right. Just grind 'em on a wheel, don't you?"

"Grindin' 'em is enough if you're gonna take heavy roughin' cuts, but if you're takin' finish cut you've got to hone 'em. But before you do anything you've got to know what you're doin'."

"Tryin' to make it complicated," said Horace.

"You're the one that'd make it complicated if you started grindin' cutter bits without knowin' somethin' about 'em." He pointed to the ground end of the bit. "Why do you think this bit is ground in this particular way?"

"For once, Pop, I'll be honest. I don't know."

"Well, I'll tell you. This happens to be a right-hand turnin' tool. That's the kind that's used oftenest. It's called 'right hand' because you use it to machine work from right to left like you've been doin' on those pistons. There's a dozen other kinds of tools—left-hand, round-nose, facin', roughin', partin', borin' and so on. Every one of 'em is ground in a certain way to do a certain job. I got a chart in the desk some place that shows all the different kinds of tools. I'll let you have it and you can stick it up on the wall."

"When you say a bit's ground to do a certain job," asked Horace, "do you mean cut certain kinds of metal?"

"Yes," said Pop, "but it's also ground for a particular kind of cuttin'—cuttin' toward the headstock or toward the tailstock, or cuttin' off a bar. For example, we've been usin' this cutter bit here to turn down pistons, cuttin' from right to left. That's why the nose swings to the right.

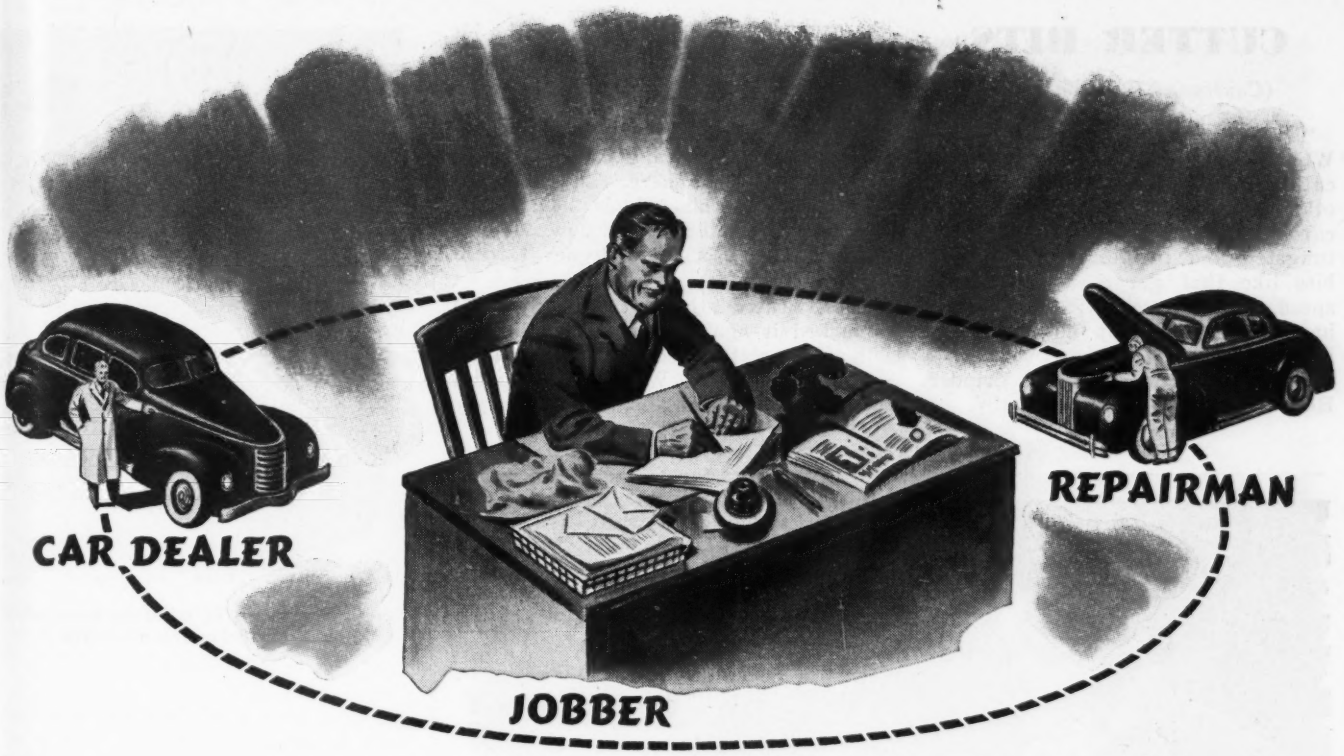
"Now on turnin' tools we've got four angles to think about when we start grindin'. First there's front clearance. That's the angle the front of the tool makes with the top. Then there's side clearance, or the angle the front edge makes with the center line of the tool. Then there's back rake and side rake."

"Wait," said Horace, "I lost you when you started rakin'."

"I'll tell you what," said Pop, "we'll grind a new tool. That'll give you a better idea of what we're doin'." He opened the cabinet in which he kept the cutting tools and took out an unground cutter bit.

"What're you gonna do with that?" asked Horace. "It's just a hunk of steel."

(*Continued on page* 50)



The other man in your shop's life

He's your McQuay-Norris jobber—the man who backs up you repairmen and car dealers in your essential job of keeping America's cars, trucks and tractors operating efficiently. You can count on him now and always. Count on him to keep you supplied with Altinized Engineered Set Piston Rings and the McQuay-Norris complete parts line*—all backed by 33 years' experience in the replacement field.

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***PISTON RINGS • PISTONS • PINS • VALVES**
BEARINGS • SLEEVES • PUMP PARTS
BOLTS • BUSHINGS • SILENT-U SHACKLES
WHEEL SUSPENSION PARTS

TIME TESTED McQUAY NORRIS AUTO PARTS PROVEN IN SERVICE

CUTTER BITS

(*Continued from page* 48)

"It's a piece of high-speed steel. When we finish grindin' it, it'll be a cutter bit. They make bits out of other metals—Stellite, and forged carbon steel, and they tip some with tungsten and titanium carbide. But bits like that are mostly for high-speed factory production. We don't have to worry about 'em in a shop like this."

Pop had reached the bench grinder. He threw the switch.

"We'll grind the left side of the bit first on the coarse wheel," he said. "You'll notice both wheels are 7 in. If we used anything smaller, we'd undercut the cuttin' edge and couldn't get the correct angle. We've got a tricky little job here. The angle of the nose on this side is 20 deg. but we can't grind straight down. We've got to grind a little deeper toward the heel."

He tilted the bit slightly and pushed it against the wheel, dipping it into water occasionally to keep from burning it. When he had taken off what he thought was the proper amount, he turned the bit over and held it against the wheel. "We grind it at a 35-deg. angle on this side." When he had finished, he showed the bit to Horace.

"You see the way the nose slants from one side to the other—about 10 deg. from the center line? We have to grind back the heel of the bit like that to get side clearance so the cutting edge will bite into the work without havin' the heel rubbin' against the work."

"How do you know it's 10 deg.?" asked Horace.

"I've done it so long I can almost guess it," said Pop. "But that ain't no way to teach a new man. I got a handy little gage somewhere. It's only made outa sheet metal, but it gives you the side and front clearance and the tool angle for this kind of work. It's easy to make the same kind of gage for any cutter bit you have to grind.

"Now," he went on, "we've got to get the front clearance right. It ought to be about 8 deg. for cast iron. We'll put the nose against the wheel at an agle like this. There, that ought to be right.

"Now we've come to those rakes that had you puzzled a while back On a turnin' tool like this, we've got to have both back rake and side rake. The back rake slopes down from the nose toward the other end of the bit. The side rake slopes down from the cuttin' edge to the other side of the nose. On threadin' tools and round-nose tools, we don't bother with side rake. On the threadin' tool we don't even have back rake.

"To grind the rake, all we've got to do is hold the top of the bit against the wheel like this so that it bites deeper a little way back than it does at the point and a little deeper at the other side of the bit than at the cut-

(*Continued on page* 52)

"He was driving 37 miles an hour while under the influence of coffee."

CUTTER BITS

(*Continued from page* 50)

tin' edge. For cast iron, we need 5 deg. back rake and 12 deg. side rake."

"If rake is so important, why ain't the round-nose tool and the threadin' tool got any?"

"The round-nose tool has back rake. It ain't got any side rake because you use it to cut both ways and, if the top wasn't square, you wouldn't have the right cuttin' angle on one side. The threadin' tool ain't got any rake because if it did it would have a tendency to chatter.

"But we're workin' on a tool for cast iron. We've got it ground for back and side rake and front and side clearance. Now we'll finish it off on the fine wheel. This is a 60-grain wheel; the other is a 36-grain. Finally we'll round off the nose slightly. We just hold it against the wheel and turn it from side to side, like this."

"You said somethin' about honin'," said Horace.

"Yes, we'll touch it up on an oil stone. A tool seems to stand up better if it's been honed." He paused and glanced at his watch. "I guess I kept you from your work long enough. Think you can grind that other bit now?"

"I guess I can. But"—he scratched the point of his jaw—"I don't get all this fuss about clearance and angles. Why don't they figure out one set of angles and stick to it?"

"Because," said Pop, "the recommended clearances and rakes have been figured out by experts and tested for years. Tools ground to those specifications work better than tools that ain't.

"You see, Horace, it's all based on the material you're cuttin'. You see this cuttin' edge? Well, the side clearance and the side rake make a wide-angle cuttin' edge or a narrow one. If you was slicin' an apple, you'd use a thin parin' knife, but if you was cuttin' wood you'd want somethin' stouter, like a chisel. It's the same way with metal. You can use a narrow-angle cuttin' edge on aluminum, but on a tough steel you'd have to have one with more strength."

"You mean I got to learn all this over again everytime I get a different metal to work on?"

"No. You know the general principles. You can get tables for the different metals. All except some steels. There's too many different alloys. You'll have to do a little experimentin'. All machinists do."

"Machinists!" snorted Horace.

"When you're able to grind your own tools," said Pop, "you'll be considerable of a machinist. I know some guys masqueradin' as machinists in war plants that can't."

Castles Is Reelected President by Dealer Body

David E. Castles, of St. Louis, Mo., was reelected president of the National Automobile Dealers Association at the recent meeting of the association directors at Cincinnati, Ohio. Julian L. Williams, of Norwich, Conn., was named secretary, and C. B. Robertson, Jr., of Richmond, Va., was elected treasurer.

Regional vice-president were named as follows:

Northeast—R. C. Jones, Reading, Pa.

North Central—Lt. Col. Herman Goodin, Huntingdon, Ind.

Southeast—E. O. Thomas, Asheville, N. C.

South Central—R. L. Ledterman, Tulsa, Okla.

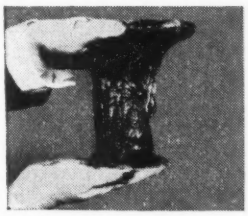
Western Mountain—Charles C. Freed, Salt Lake City, Utah.

Pacific Coast—M. O. Anderson, Seattle, Wash.

A post-war planning committee was appointed with Arthur Summerfield, of Flint, Mich., as chairman. Other members are A. J. Dingeman, Oxnard, Cal.; J. N. Mitchell, Waco, Tex.; Bob Fleigh, Baltimore, Md.; E. J. Beatty, Denver, Colo.; C. M. Bishop, Brooklyn, N. Y., and Lynn S. Snow, Oak Park, Ill.

"TODAY I go to the dealer who gives me a MARFAK job!"

"I'm in war production and my car's got to keep rolling. It gets me and four other men to work and home again every day, seven days a week. So I take care of it right!"



Today, Mr. Dealer, there are thousands of car owners with the same idea. They've got to keep their cars rolling and rolling right.

That's why many get interested in Marfak. They read about it in the magazine ads. They hear about it on the Fred Allen radio show and from their friends. First thing you know they pop into a dealer's and get a demonstration. That usually sells them. Then when they get Marfak in their cars . . . they are fully convinced.

Many alert dealers are finding out that right now is a good time to build lube profits with Marfak. Let a Texaco man show you how easy it is to demonstrate Marfak and to prove to your customers that Marfak really sticks to its job and brings 'em back.

Don't miss the opportunity. Talk to your Texaco man, 'phone the nearest of 2300 wholesale distributing points or write The Texas Company, 135 E. 42nd St. New York, N. Y.

TUNE IN: FRED ALLEN
every Sunday night—C. B. S.

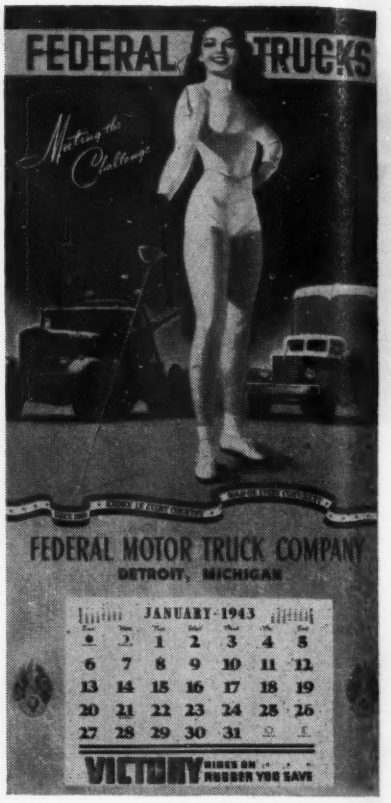
TEXACO
REG. T. M.

YOU CAN MAKE MORE MONEY WITH MARFAK

Fleet Service Course

An automotive service training course for men who supervise the operation and maintenance of large fleets of passenger cars and trucks has been established by The Studebaker Corp. It consists of a week's intensive training.

"The establishment of this, an entirely new type of course, is a further step in the company's program to make its utmost contribution toward the maintenance of that vital segment of our national transportation system represented by passenger cars and trucks," C. H. Wondries, director of the Studebaker National Accounts Division, explained. "Operators of automotive equipment today are confronted with entirely new maintenance problems because of the war. For example, the 35-mile per hour speed limit and restricted mileage necessitate revisions in automobile service practice. In the light of these changes Studebaker has evolved new service procedures specifically adapted to wartime driving conditions. Through the course, this information is passed on to fleet operators whose maintenance problems, while similar, are multiplied many times over those facing the individual."



"Miss Federal" Calendar

Again the Federal Motor Truck Co., of Detroit, makes a strong bid for truck owner interest by the issuance of a new Miss Federal calendar. This year the Miss Federal calendar is not restricted to providing a lovely girl illustration, plus a daily date record, but its usefulness goes a long step farther in presenting a valuable Weights and Measures Table of trucking payload items—a time-saving, ready reference covering every type of material and product hauled by truck.

Another famous "Miss Federal" painted by K. O. Munson, one of America's foremost illustrators, keynotes the story pictorially of how Federal heavy duty trucks are "Meeting the Challenge" on the home fronts and war fronts of today. Each of the twelve monthly calendar pages carries a timely and patriotic appeal that keynotes a spirited reminder of our country's wartime needs. Qualified truck operators and motor transportation men may obtain the "Miss Federal" calendar without charge or obligation by writing to the Advertising Department of the Federal Motor Truck Co., Detroit, Mich.

Edward T. Ball

Edward T. Ball, associated for 30 years with the Joseph Strauss Co., Inc., of Buffalo, N. Y., automotive distributors, died in Buffalo Jan. 29 after a three-week illness. He was secretary and sales manager of the company. He also was secretary of the Manufacturers & Equipment Wholesalers Association.

CHECK LIST

(*Continued from page* 29)

future. Like a lot of other women who now find themselves responsible for the care of the family car, we're constantly amazed and aggravated at the number of "surprise" bills it accumulates. The idea of a guide to future repair needs appealed to us and we wrote for a copy of the check list (it was free) to see what it was all about.

We were agreeably surprised. It seems to be the best solution yet offered, for it tells us exactly what we need to do now, and gives us a pretty definite outline of what we'll need to do soon, *and* much later. It allows both us and the repair man to budget both our time and our money to the best advantage.

The check list is divided into three sections. The first tells car owners why "P.S." is wise and necessary for their automobiles. It explains that the car must have a thorough checking to start with, and, because of the extensiveness of this primary check, the car owner should phone for a service appointment in advance. It also advocates leaving the car at the shop for a full day if this can be arranged.

The second section is the check list itself—40 items for the service man to inspect. It covers everything from the automatic choke to windshield wipers and includes inspection of compression, wheels, steering, brakes, tires, etc.

The third part is headed "P.S. Prescription for Your Car" and that page is divided into three sections leaving room for three types of entries. The first are items which must be repaired *now* (these are urgent and need immediate attention). The second group are items which must be fixed *soon*, and it would really be wise to take care of them now if it can be arranged. The third group of items includes those which show signs of wear but for which repairs and replacements are not now immediately urgent.

The use of this list allows service men to plan their work on a long-time basis. That, in addition to the appointment system which it advocates, will mean less interruptions and fewer wasted man hours. It would allow men now on the job to turn out much more work per day and to fill, at least in part, the gap left by the loss of so many skilled mechanics to the war and war industries.

To us car owners, it means that we can spread the cost of needed repairs over our long-time budget. It means the end of these awful "surprises" and *we* welcome the idea. We think repair men are going to se a lot of these "P.S. Check Lists" before long.

Elected Vice President

Carl S. Clingman has been elected a vice-president of the Johns-Manville Sales Corp. with headquarters at Chicago.

As vice-president, Clingman will also continue in his previous capacity as general sales manager of the transportation department with headquarters at Chicago as heretofore.

Albert C. Pickett has been appointed division sales manager of the western division of the transportation department with headquarters at Chicago.

John D. Johnson has been appointed acting division sales manager of the eastern division of the transportation department with headquarters at New York, succeeding P. E. Redding who has been commissioned a lieutenant in the naval reserve and called to active duty.

Fred Fix has been appointed acting division sales manager of the central division of the transportation department with headquarters at Cleveland, Ohio, replacing Johnson.

Alvin L. Williams has been appointed assistant sales manager, automotive section of the eastern region transportation department, with headquarters at New York, succeeding H. V. Conroy, resigned.

"OK, Snap-on, America gets MY idle tools!"

"I know how tough the going is for the boys back in the shop. A lot more work . . . fewer men to do it . . . longer hours. New tools? . . . well, try to get 'em! Uncle Sam's needs come first . . . and nobody wants to beef about that. Yet in spite of everything the boys *have got to keep those babies rolling!*

"So OK, Snap-on, count me in. Your offer to appraise my tools at a fair price for a cash deal sounds alright to me. I'm sending in that coupon *now.*"

* * * *

LET'S ALL pitch in and lick this shortage that increasingly handicaps the service industry. The one quick, sure way to do it is to *get every idle tool back to work!*

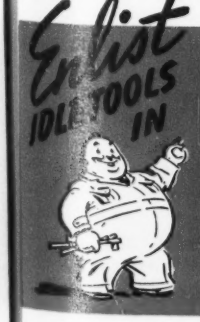
You men who are going into service . . . and you who have gone into some war industry where your tools are not needed . . . get those tools back into the fight . . . *America needs them!*

If you cannot yourself contact a mechanic seeking tools, we'll try our utmost to do the job for you. We organized our Tool Enlistment Division for just that purpose. Talk it over with your Snap-on man — or call at the nearest Snap-on branch office — or write direct to the Tool Enlistment Division. We'll arrange to make a fair cash appraisal of your tools, *and to put them back to work!* Fill in, and mail the coupon today!

TOOL ENLISTMENT DIVISION

SNAP-ON TOOLS CORPORATION

8036-C 28th Avenue **Kenosha, Wisconsin**



Snap-on Tool Enlistment Plan

HELP AMERICA WIN ON WHEELS

Tool Enlistment Division, SNAP-ON TOOLS CORPORATION
8036-C 28th Avenue, Kenosha, Wisconsin

Send me full details of the Snap-on Tool Enlistment Plan.

(Check one of these)
- ☐ I have tools, and am ready to enlist them for Victory, at fair cash prices.
- ☐ I need tools, and will consider purchasing Victory tools of good quality and condition, at fair prices.

Name.....

Address.....

.....

COMPRESSOR

(*Continued from page* 28)

Examine the driving belts for oil or dirt accumulation and tension whenever cleaning the unit. The belts do not require any dressing and should be kept clean and at the proper tension. Each time the belt tension is adjusted, the compressor pulley and motor pulley alignment should be checked. Adjusting screws and pulley set screws should be kept tight.

Examine the electric equipment every two months and blow all dirt out of the motor. On direct current and single-phase motors, the commutators should be cleaned off as often as inspection shows that it is necessary. Oil the bearings of the motor whenever inspections are made. About twice a year, the valves, valve seats, bearings, rings and pistons should be inspected. All carbon deposits should be cleaned out and any parts that show excessive wear should be replaced.

If the compressor unit starts to operate excessively, a careful check should be made for air leaks. Audible leaks are usually fairly easy to detect. Smaller leaks are often very difficult to locate and, to assist in finding them, the joints and connections can be painted with soapy water or a little oil from an oil can may be used. Any leaks should be corrected immediately.

All compressors are designed to run a certain length of time from the "kick in" point to the automatic shut-off point. This is probably the best test of efficiency that can be made on the unit. The manufacturer of your unit can supply you with this information for your particular model, as well as give you any detailed service information you may desire.

"How soon can I buy some of those sympathetic tires I've been reading about"

W. C. Dodge, Jr., Elected President by NSPA

Walter C. Dodge, Jr., of Ferodo and Asbestos, Inc., New Brunswick, N. J., has been elected president of the National Standard Parts Association to succeed R. L. Terry, United Wholesalers, Sioux City, Ia.

William J. Menghini, Springfield Auto Supply Co., Springfield, Ill., was named senior vice-president. In that capacity he will represent the Wholesaler Division of NSPA. The third elected officer is W. D. Kirkpatrick, Manley Manufacturing Division of American Chain & Cable Co., Inc., York, Pa., who will serve as junior vice-president and chairman of the association's Manufacturer Board of Governors.

For the first time in the association's history the balloting for this year's officers and directors was conducted by mail.

In brakes as in battles, it pays to be *right* the first time!

With Thermoid Precision Processing, brake jobs are right from the start, as they should be. No call-backs for readjustment. Thermoid Precision Processed Brake Shoes—just as you get them from your Thermoid distributor—make full, even contact with the brake drums. No tinkering. No hand burnishing. Your customer gets smooth, quiet, safe stops *right* from the first push on the brake pedal!

Precision Processing is an *extra* to sell: *custom-engineered* brake service—a service far beyond mere brake shoe exchanging.

Thermoid Brake Linings are *right*, too—certified correct for each model of each car by Pittsburgh Testing Laboratory. Thermoid Precision Processing is the *extra* step that makes every brake reline—*right the first time!*

Thermoid

Custom-Built Brake Lining Sets

plus

Precision Processing

THERMOID CO., TRENTON, N. J.

Detroit Letter

(*Continued from page* 39)

is considered an average one under normal conditions. The industry's peak year was 1929, when domestic sales totaled 3,880,206 passenger cars. Retail sales in 1941 were not far behind that figure, totaling 3,731,166 units. Therefore, an 11,000,000-car market would indicate three years' demand piled up.

Even with the war over, the most optimistic estimates are that three to six months will elapse before automobile production can be resumed, using 1942 model dies. This presupposes that the 1942 dies will not be diverted to scrap for war use. The latter possibility now appears unlikely in view of the success of the recent scrap-metal drive and the improving outlook on the world's battlefronts for the United Nations.

Availability of tires for the new cars produced is another factor that may limit immediate post-par output of passenger cars. After the starvation rations upon which the motor vehicles of the country have had to get along since the Japanese seized more than 90 per cent of the world's natural rubber supply in the southwest Pacific, the demand for casings and tubes for the surviving cars when the war ends is bound to be tremendous. Unless the expanding synthetic rubber industry is able to supply an appreciable number of tires for civilian use before the war ends, there is likely to be a replacement demand for more than 80 million tires when peace comes. Also, each new car must be provided with four or five tires.

The rubber industry probably has not been dislocated to the same extent as the automobile industry, but there still will be a problem of getting enough molds operating to supply this huge demand. In addition, the rubber must be made available for manufacture of the tires. If all goes well, synthetic-rubber factories may be producing 800,000 tons per year by 1945, which is a surer source than the rubber plantations of Malaya and the Dutch East Indies, even if they are recaptured from the Japanese.

Peak tire production year was 1928, when 77,943,814 casings were produced in the U. S. Output in 1941, before the rubber shortage became acute, was 61,532,656 casings, which was the biggest total over a 12-year period. The industry would be pushed to produce more than 80,000,000 tires in a year, especially in the period of adjustment that will follow the war's end.

Due to all the problems involved, some look for control of automobile production in the immediate post-war period, either voluntarily by the industry itself or by the government. Whether rationing of new vehicles will be necessary during this period of readjustment is a matter of conjecture.

As stated before, the immediate post-war cars will be the 1942 models, but the "cars of the future," which will not be ready for a year to two years after the cessation of hostilities, may present some innovations from present designs. Although unlikely to be as radically different as the Buck Rogers creations of some imaginative designers who have let their concepts of plastics and aerodynamics run wild, there still may be new models that will be a departure from present standards.

A number of factors will be considered in presenting the new models of 1946 or later. If the present 35-m.p.h. speed law is retained after the war in the interests of highway safety, this would have a marked influence on design and engine horsepower. The availability of high-octane gasoline and its price may have a considerable effect upon engine design. If the post-war period finds inflation in effect, it may influence the type of new car to be produced.

High tax rates may dictate that a lighter and cheaper car be produced.

(*Continued on page* 62)

POWER TO SMASH THE AXIS

Here is America's pride . . . Here is the mightiest naval aircraft engine ever to fly in enemy skies!

It is the great eighteen-cylinder, 2,000 horsepower supercharged Pratt & Whitney engine that powers the U. S. Navy's fastest, deadliest fighter . . . the carrier-based *Corsair! . . . And it is built by Nash!*

Of the radial air-cooled type with a high-altitude supercharger, this great engine contains 10,000 separate parts. It is four feet five inches in diameter, weighs slightly over 2,400 pounds and develops 2,000 horsepower, or approximately 1.2 pounds of weight per h.p.—close to the theoretical ideal of a pound per horsepower, which engineers once considered unattainable. No wonder the Corsair it powers can outfly, outclimb and outmaneuver anything now in the sky!

• • •

With all our might, we're working to speed the day of Victory . . . the day when all of us can turn to peaceful things. The day when we'll pick up again—where it was interrupted by war—the same drive and power and spirit of progress that developed the Nash "600" (with its 25 to 30 miles per gallon and its almost unbelievable tire mileage) into the fastest-growing and most modern automobile in America!

And we promise you that then, out of new skills, new resources, new facilities developed by war, will come a great new Nash program.

NASH BUILDS GREAT ENGINES!

This Nash-built 2000 h. p. Pratt & Whitney aircraft engine packs five times the power of the original P & W engine built in 1925 . . . yet the engine diameter is exactly the same! A truly remarkable example of engineering progress.

LOOK AHEAD WITH NASH

Division of Nash-Kelvinator Corporation, Detroit, Michigan

DETROIT LETTER

(*Continued from page* 60)

However, this will be complicated by the fact that motor-vehicle production costs are estimated to be up 20 per cent on the basis of present wartime wage rates. More efficient production and labor-saving machine operations may be the answer to this problem. A lighter car may call for a frame which forms part of the body, such as is the case with the Zephyr and the Nash "600." Style and appearance have been the keynotes of automobile salesmanship in recent years. These might be displaced by low cost and economy of operation in an era of high taxes.

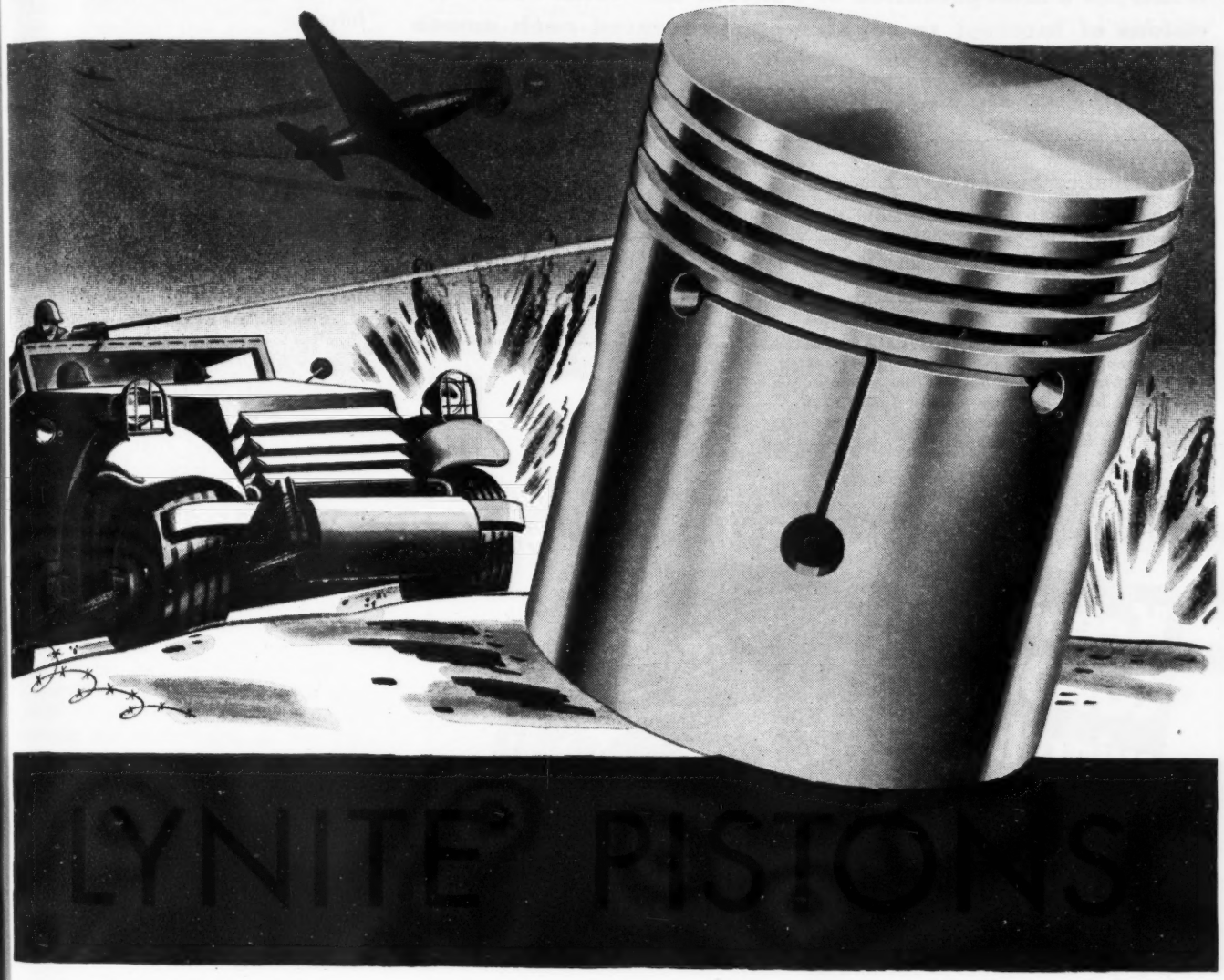
Some of the light metals whose supply has been greatly increased due to wartime demand also may figure in the new post-war car. But aluminum and magnesium still must compete with steel on a price basis and alloy steel developments have been greatly increased through armament research. Aluminum-coated steel sheets already are available. Aircraft developments in laminated plywood and plastic also may have an influence on post-war body design.

"I got over 900 miles on my last pair of pants."

Among the military vehicles, only the jeep is considered to offer possibilities for volume post-war sales. Willys-Overland Motors, Inc., which developed the jeep model upon which the U. S. Army standardized and is its largest producer, plans to set up a separate sales organization for marketing this type vehicle after the war. However, Willys officials have no illusions about the market for the jeep. Its greatest uses are seen in agriculture, for small farms of 30 to 100 acres where it can be employed as an all-purpose vehicle for hauling implements in the fields as well as taking produce to market. In this role it would combine the functions of a tractor, truck and passenger car. It also can be used in rough frontier country, such as in mining or lumbering operations, where an all-wheel drive is essential. There also should be a big export market for countries where good roads are non-existent, such as in China, India and parts of South America. The jeep also may play a part in delivering mail and freight to airports in remote parts of the world. However, for all these uses there may be many jeeps left over from military operations which will be disposed of cheaply by the Army or by the Lend-Lease nations as surplus vehicles. This will cut into any post-war market.

As a passenger vehicle or a pick-up truck for ordinary city or highway use, the jeep is regarded as too expensive for volume sales. In such cases the four-wheel drive is a liability rather than an asset. It adds about $150 to the cost of a $700 vehicle with few compensating advantages. Maintenance of the four-wheel drive is an added complication and the gasoline consumption is greatly increased. Only convertible part of the jeep for a low-cost passenger car is the 65-hp. engine, which came originally from the 1942 Americar, with lower compression for military use. The jeep is the vehicular sweetheart of the Army but it is not the Model T of tomorrow.

Only their work is different..



They're very much on the job today, just as they were during peacetimes. But now they're in the service; on the ground, in the air, on the sea and under it. Lynite Pistons are seeing to it that Uncle Sam's fighting men get all possible power out of their equipment.

Lynite Pistons are helping to make fuel and oil go farther, too, just as they did for you in civilian life. And they are assuring longer life for engines, no matter how hard equipment is being pushed.

Experience gained under this gruelling war service is advancing the art of making pistons. You will profit by these advances when you can again get Lynite Pistons for your engine work. ALUMINUM COMPANY OF AMERICA, 2133 Gulf Building, Pittsburgh, Pennsylvania.

*Registered Trade Mark, Aluminum Company of America

LYNITE Reg. T. M.

LYNITE PISTONS A PRODUCT OF

ALCOA ALUMINUM

LEGALLY SPEAKING

A lawyer's interpretation of Federal and local court decisions of interest to repairmen, presented each month

By C. R. ROSENBERG, JR.

Performance Somewhere Else

Where a repairman enters into a contract that is to be "performed" outside his own state, he may find himself tangled in the laws of another state if any dispute should arise.

Suppose, for example, a repairman makes a deal in his own shop whereby work is to be done or goods are to be delivered in another state. If trouble arises, the laws of his own state will not protect him, for in such transactions the contract is controlled by the law of the place of performance."

"Where a contract is, either impliedly or expressly, to be performed in any other place than where made," explained a New York court recently, "the general rule is that it is to be presumed that the parties intended that the contract should be governed by the law of the place of performance." *(Zwirn vs. Galento, 43 Northeastern Reporter, second series, 474).*

Responsibility for Employee's Acts

A repairman's responsibility for the acts of his employees or agents is pretty broad, under the definitions usually given by the courts. Ordinarily, it is said that an employer or principal is legally liable for the acts of the employes or agent done in the course of his employment.

Fortunately, there are limits beyond which the employer is not responsible. Suppose, for example, that the agent or employee perpetrates a swindle "on his own," Is the employer responsible for it?

"We think it is well settled law," said the Supreme Court of Minnesota recently, "that an agent's knowledge will not be imputed to his principal when he is engaged in an independent fraud. In such circumstances, it cannot be supposed that he will inform his principal or employer of it. Moreover, when he is engaged in perpetrating such a fraud, he is not acting within the scope of his employment." *(Blumberg vs. Taggart, 5 Northwestern Reporter, second series, 388).*

Two Chances for Broken Contract

If a repairman enters into a contract and faithfully carries out his part of it, but the other fellow defaults, what redress has he?

"The relief for breach of contract," says the Kentucky Court of Appeals, "is a legal action to recover damages resulting from the breach."

"Damages" means financial compensation.

But suppose that, in the circumstances of the case, the wrongful breach of the contract cannot be properly and adequately remedied by cash.

"In that case," continues the Kentucky court, "a court of equity will decree specific performance."

Specific performance means to carry out the terms of the contract as agreed upon.

Specific performance is a very rare legal bird indeed. The chances of getting cash "damages" are much better. *(Duff vs. Chaney, 164 Southwestern Reporter, second series, 483).*

SPITFIRE ENGINE

(*Continued from page* 33)

casing between the two rotors, serving to control the temperature of these and their casing. A special pump is provided for this cooling system, for the latter is entirely separate from the cooling system of the engine itself.

Despite the larger size of the supercharger, it adds only 5 in. to the overall length of the engine relative to the Merlin XX. As regards weight, the "61" is said to weigh approximately 1600 lb. "dry," compared with the 1450 lb. of the earlier model.

Another difference in design is the adoption of detachable cylinder heads for the "61." The two-piece cylinder blocks are similar to those designed by Rolls-Royce for the Merlin XX produced by the Packard Co. Circulation of the coolant between cylinder jackets and head jackets is through exterior connecting ports with rubber seatings.

Available data on the Merlin 61 follows:

No. of cylinders	12, in two monobloc castings set at 60 deg. with detachable heads
Bore and stroke	5.4 in. x 6.0 in.
Piston displacement	1649 cu. in.
Valves	2 inlet and 2 exhaust per cylinder with overhead camshaft and rocker arms.
Coolant	Water and glycol (30 per cent)
Compression ratio	6.0 to 1
Propeller gear ratio	0.42 to 1
Rotation	Engine, right-hand; propeller, left-hand

NAPA Reelects Officers To Serve New Terms

All officers of the National Automotive Parts Association were reelected for the ensuing year at the annual meeting of the organization held at Detroit, Jan. 27 and 28.

R. L. Vaniman, director of the Automotive Division of the WPB, was the guest at a luncheon Jan. 28, where he talked on the necessity of maintaining the nation's automotive vehicles in operating condition, in order to carry forward the vast production programs directly essential in the war effort.

The officers elected for 1943 are: President, Ralph W. Boozer, Boozer-Test Management Service, Indianapolis.

Vice-president, E. S. Baldwin, Automotive Parts Company, Columbus, Ohio.

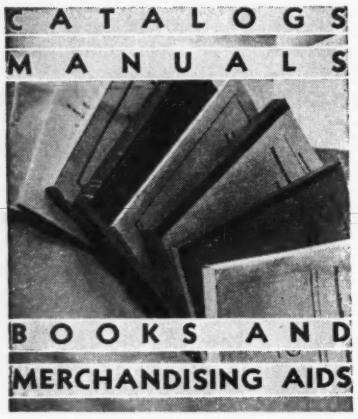
Executive Vice-president and Secretary-Treasurer, Henry Lansdale, Detroit.

The board of directors includes the officers, and the following: W. W. Martin, NAPA Pittsburgh Warehouse, Pittsburgh: A. F. Baxter, Unit Parts Corp., Buffalo, N. Y.; C. C. Colyear, Colyear Motor Sales Co., Los Angeles, Calif.; Carlyle Fraser, Genuine Parts Co., Atlanta, Ga.; R. J. Harris, Standard Unit Parts Co., Minneapolis, Minn., and J. R. McCoy, Quaker City Motor Parts Co., Philadelphia, Pa.

Hoag Honored

Edwin R. Hoag, president of the Ditzler Color Co., was recently honored by a farewell dinner at the Detroit Athletic Club, marking his retirement after 30 years of Ditzler service. The dinner was attended by more than 60 friends and associates. The principal speaker of the evening was Frank W. Judson, vice president of the Pittsburgh Plate Glass Co., of which the Ditzler Color Co. became a subsidiary in 1928.

In 1913 Hoag joined T. W. Connor and a group of associates in the purchase of the Ditzler brothers' interests. Under his management, the company which had become famous as a leading producer of carriage paints, became an outstanding manufacturer of automobile finishing materials.



Manbee Tire Inspector's Manual

The Manbee Equipment Co., Inc., has just announced the publication of a new Tire Inspector's Manual. This manual has been prepared by Manbee in close cooperation with the Office of Price Administration under whose direction federal tire inspectors operate.

The manual contains complete details of the causes of tire wear and the diagnosis of each of the causes so that the inspector can recognize at a glance any incorrect condition of wheel alignment that might exist. The various angles of wheel alignment are completely explained and many suggestions are given that will increase tire mileage.

This manual may be obtained free by writing to the Manbee Equipment Co., Inc., 406 S. Kolmar Ave., Chicago, Ill., and asking for a copy of the "Tire Inspector's Manual."

* * *

A mechanic's and driver's handbook has been issued by the Fuller Transmission Co., Kalamazoo, Mich. It covers briefly but comprehensively the care and attention required in the operation of the modern multi-speed transmission unit. In addition, the handbook covers the procedure for the disassembly and servicing of various models of transmissions and clutches produced by Fuller.

The material is particularly timely due to the war emergency and the need for conserving vital transportation equipment.

* * *

Brake Service Standards Offered Repair Shops

Because war essential motor vehicles are irreplaceable and need maximum braking efficiency and the longest possible brakelining wear, Grey-Rock is offering the National Safety Council Brake Servicing Schedule to all shops.

Developed by leading brake technicians under N.S.C. engineers, supervision, this set of standards insures quick, safe, and complete check on brake inspection, adjustment and relining for passenger-cars; and trucks and buses with vacuum, air, or electric controls.

Heretofore offered only through Grey-Rock jobbers, any shop may now get a complete copy of these important N.S.C. Brake Standards by writing to United States Asbestos Division of Raybestos-Manhattan, Inc., Manheim, Penna.

Foundry Engineer

Announcement has just been made of the appointment of Stanley Norrick as general foundry engineer of The Perfect Circle Co. Norrick, who has been plant manager of the New Castle operation since 1926, took over his new duties Feb. 1. At the same time, it was also announced that Richard H. Bancroft, formerly assistant plant manager of the New Castle plant, has been named manager, effective Feb. 1.

Norrick, whose headquarters will be at the Perfect Circle New Castle Plant, will devote full time to foundry engineering problems for all Perfect Circle plants. It was stated that these changes in personnel were made necessary because of Perfect Circle's rapidly expanding business, the the greater part of which is now on direct war work.

BRAKES

(*Continued from page* 23)

again be tightened. Those cam adjustments not provided with a lock nut are locked in any position by means of a spring lock.

The next step is to check what is known as the pedal reserve, or the distance the pedal pad is from the floor boards when the brakes are applied. In general, this should be at least one half the total travel of the brake pedal. If this proves to be satisfactory, the car should be driven on the road and the action of the brakes checked under actual driving conditions.

If it is found that that action of the pedal is not solid or is "spongy" when the brakes are applied, it indicates that there is air in the hydraulic system, which must be removed. This process is known as bleeding and will be described in an article in an early issue. Another check is made by tapping each of the brake drums with a wrench. If a bell-like note is made, it indicates that the brake shoes are not dragging on the drums and also that the wheel bearings are correctly adjusted and not defective. If a dead sound is noted, the shoe adjustment should be rechecked and the wheel bearings examined to make sure they are not broken or incorrectly adjusted.

When new brake lining is installed or it is impossible to get satisfactory brake operation with the minor adjustment just described, a complete or major adjustment which centralizes the shoes within the brake drums is necessary. The procedure is as follows:

After placing the car on jacks, remove inspection-hole covers on brake drums and adjust the anchor pins and adjusting cams until there is .005 in. clearance at the lower end of each shoe and .010 in. clearance at the upper end of each shoe. This clearance is measured by means of a thin strip of metal of the desired thickness, and is known as a feeler gage. A .005 in. gage is placed between the brake lining and the brake drum at the lower end of the shoe and the wheel is rotated and the anchor pin is adjusted until the feeler gage is just gripped. The procedure is repeated at the upper end of the shoe, using a .010 in. feeler gage.

Recheck the clearance after each adjustment and repeat the adjustment for each shoe at each wheel.

Unfortunately all brake drums are not provided with inspection ports. On such cars, it is then necessary to remove the brake drums, then loosen the anchor pin lock nut on the inside of the brake backing plate and disconnect the parking-brake cable at the rear wheels. A special gage is then mounted on the wheel spindle or axle end, and the clearance measured between the arm of the gage and the brake lining. Some shops have special brake drums which they use as a gage.

In an emergency when no gages are available, it is possible to obtain a fairly satisfactory adjustment by adjusting both top and bottom of the shoes to the same clearance by turning the adjustments until the shoes contact the drum and then backing off on the adjustment until the wheel rotates freely. However, much better brake operation is obtained when the shoes are adjusted to the proper clearance by means of the proper gages.

Instructions covering the adjustment of other types of hydraulic brakes will be given in an early issue.

Named Vice President

At a recent meeting of the board of directors of the Pennsylvania Rubber Co., Jeannette, Pa., P. C. Mathewson, factory manager, was elected vice-president in charge of factory operation. Mathewson has had extensive manufacturing experience in the rubber industry and prior to joining Pennsylvania in October, 1941, was for several years factory manager of the Armstrong Rubber Co., West Haven Conn.

Head Replacement Sales

The reorganization of the Replacement Sales Division of the Sealed Power Corp., Muskegon, Mich., has been announced by Paul C. Johnson, vice-president.

John E. Norwood

Three men will head up this division under Johnson with John E. Norwood as sales manager, Victor J. Paquin, service manager, and Harold L. Baldwin, market research manager. Norwood, sales promotion manager since since 1933, has been with the Sealed Power Corp. since 1920. In his new position he will have charge of sales activities in the field, advertising and sales promotion.

RECAPS

(*Continued from page* 35)

sumed that sufficient was on hand to handle the expected volume of work.

It was emphasized that permission to have tires recapped without the rationing order that has been necessary for the last year does not exempt an owner from the necessity of having his tires inspected regularly. The OPA pointed out that a carcass can be recapped only when it is in good condition and that failure to have tires inspected at the required intervals might result in the destruction of a carcass that could otherwise be recapped one or more times.

Local Advisory Groups To Be Named by ODT

Advisory committees are to be established throughout the country by the Office of Defense Transportation to assist private and for-hire carriers, truck factory branches, truck and automobile dealers, repair shops and parts jobbers work out solutions to problems posed by parts and equipment scarcities and the mechanic shortage.

Each committee will be composed of seven members, one representing each of the seven divisions of the industry named above. It will also include a maintenance specialist from the district ODT office.

New-Car Ration Eased

MANY of the requirements that have restricted new-car sales since stocks were frozen at the beginning of last year were lifted Feb. 26 by the OPA.

Under the new rules, anyone needing a car in a gainful occupation or in work related to the war or public welfare may purchase without a ration certificate a 1941 model driven less than 1,000 miles. Likewise, anyone needing a car for any of the above reasons and does not have the use of a "serviceable" car may purchase a model listing at $1,500 or more. On models costing less, the list of eligibles has been widened considerably to include most persons on the C list of the gasoline rationing but without regard to the number of miles driven. The specific occupations on the list are:

Official government or Red Cross business, school-to-school travel, group school transportation, carrying U. S. mail, wholesale newspaper delivery and supervision, carrying non-portable photo equipment, medical, veterinary, public health calls, embalming, ministerial calls, carrying farm produce and supplies, transporting farm workers, fishermen, seamen, marine workers, radio broadcast engineers, and other essential workers, recruiting and training workers, members of the armed forces, delivery services, scrap dealers, selling essential products, and labor relations and social workers.

Automotive Sales Chief

Wm. B. Given, Jr., president of the American Brake Shoe and Foundry Co., announces the appointment of J. F. Weller as director of automotive sales for the Brake Shoe Co. Weller retains his position as president of the Kellogg Division of Brake Shoe

J. F. Weller

Besides the products made for utomobile manufacturers, at the present time, Brake Shoe has two divisions that specialize in the automotive service and equipment field. American Brakeblok, located in Detroit, manufactures brake lining, clutch facings, and fan belts. The Kellogg-American line includes air compressors, paint sprayers, car washers, and a line of auto lifts.

Weller has been associated with Kellogg since 1910, and with Brake Shoe since 1939.

Auto-Lite to Launch New Ad Campaign

Victory driving speeds, gas rationing and their effect on automotive ignition and electrical systems are the basis of a new advertising campaign soon to be launched by The Electric Auto-Lite Co. For example, the company points out that reduced driving has a tendency to impair the efficiency of a battery because the car generator does not operate long enough to keep the battery fully charged. Likewise, spark plugs, designed for higher speeds, are more subject to fouling at the 35-m.p.h. limits.

"Often little but important things can help stretch your ration to cover more car miles. This is especially true of the small, but complex units, which make up the electrical system, your car's lifeline," the copy says. Speaking of the distributor, the first advertisement in the series continues, "weak, dirty or pitted points, poor electrical connections or a weak condenser are a few pint-sized troubles which can waste gasoline by the barrel in America's motor cars. Adjustment or replacement of a minor part may be all that is needed to restore 'like-new' performance."

Chosen President

J. C. McKalip has been elected president of the Quinplex Corp., Pittsburgh, Pa., which manufactures Quinplex twin-valve gasoline tank caps.

McKalip succeeds H. D. Montgomery, who served the corporation as president from the time of its founding in 1938 until his death last Nov. 27.

WHISPERS

(*Continued from page* 35)

Their technique in handling so-called non-essential drivers is reminiscent of the method used by the farmer to cut his feed bill by getting his horse used to eating less oats each day until, finally, the horse's daily ration was reduced to zero. It was a wonderful experiment, and successful, except that the horse died.

*LONGER WEEK

Don't take too much comfort from the fact that your locality has not yet been designated a critical labor-shortage area and that you do not as yet have to lengthen your working week to 48 hr. With men being drafted at the rate of 60,000 or more a day, a good many areas are going to find themselves pinched for labor, and will be added to the original 32 critical areas. There is talk that shops employing eight persons or less will be exempted from the Presidential order, but this is not certain.

You may disagree with the wisdom of the order and hold, as many others do, that it is just a slick way of giving organized labor the pay rises it demands without violating the so-called Little Steel formula of tying increases to the cost of living, but there it is. It would do no harm to do a little thinking about how you could lengthen your shop hours in case the necessity should arise.

*SPARE TIRES SAFE

It would be a rash man who would predict what the government will or will not do, but it does seem that many rumors going the rounds are unfounded. One of the latest is that the government is going to descend upon every passenger-car owner in the country and snatch his spare tire. This straw will not be laid upon the suffering motorist's back, so far as can be learned from any official source.

*REPAIR MANUAL

Automobile repair manuals may come out of the war in a far different form from that in which they entered it. The Army has squawked plenty about the lack of uniformity in the different manuals, even when identical units are involved. Factories are said to be attending to the matter. This is all to the good, perhaps, for some manuals can stand improvement, but one wonders whether the frequent instances of tackling right now problems that have been with us for years do not indicate that some bureaucrats forget that our first and foremost job at the moment is fighting a war.

TRANSIT TAXED

(*Continued from page* 40)

how any transportation system can continue to function under such an overload, yet other war-production centers are little better off. San Diego, Cal., had an increase in streetcar and bus riders of 336 per cent, Portland, Me., 236 per cent, Savannah, Ga., 207.1 per cent, and San Antonio, Tex., 207.4 per cent.

Northern cities, in most cases, are in better position than those in the South. For example, Philadelphia had an increase of only 55.8 per cent and San Francisco's riders increased only 19 per cent.

Allocation of new rolling stock has been niggardly and, in view of the present high level of war production, it does not seem probable that diversion of materials for such purposes will be expanded. The load now being borne by public transportation systems has, therefore, reached the virtual saturation point. If the tremendously expanded volume of passenger traffic of the country is to be transported efficiently, the private automobile must be kept on the road.

BIG-INCH OIL

THE first oil to reach the East by way of the new 24-in. pipeline from Texas to Norris City, Ill., arrived at a Philadelphia refinery Feb. 23. It consisted of a shipment of 16,000 barrels. The oil was pumped from Texas to Illinois and transferred to the East by railroad tank car.

(*Continued on page* 82)

BIG-INCH OIL

(*Continued from page* 80)

Eventually, loading at Norris City will amount to 250,000 barrels a day, and the shipment of oil to the East will be boosted about 120,000 barrels a day through freeing tank cars from the Texas-Illinois run.

Meanwhile, completion of the "Big-Inch" line from Illinois to Philadelphia and New York is being rushed. It is expected to be in operation later this year.

No hopes are held out that the increased flow of oil to the East will relieve the civilian shortage of gasoline, since the demands for military use are increasing rather than diminishing.

TRUCK RATIONING

RATIONING and price ceilings on used commercial vehicles may come soon, H. Richard Stickel, executive assistant to the director of the Division of Motor Transport, ODT, told the New Jersey Motor Truck Association at Newark, N. J., last month. Profiteers are asking 10 to 50 per cent more for a used vehicle than when it was bought new, he declared.

A plan to ration used trucks has been talked of in the ODT for some months. In fact, rumors had it that the plan, along with price ceilings, was to have been put into effect several weeks ago. Why it has been delayed has never been explained, but Stickel's statement would seem to indicate that early action may be expected.